

PUBLIC STORAGE #25905

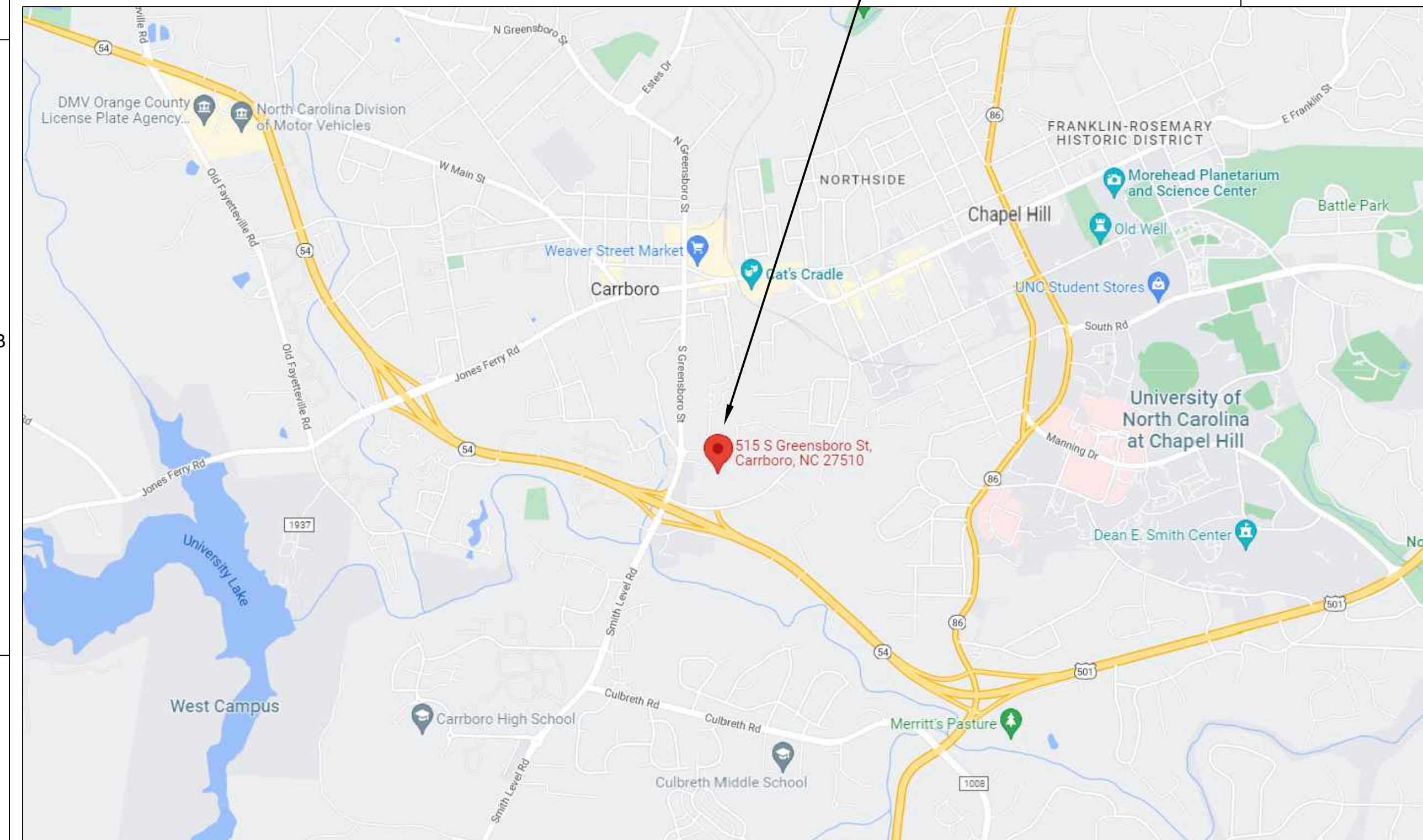
INTERACTIVE SOLAR PHOTOVOLTAIC SYSTEM

515 S GREENBORO ST
CARRBORO, NC 27510

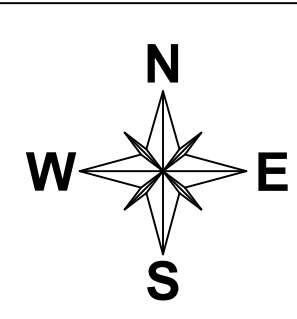
PROJECT LOCATION: 35.90275 N 79.07057 W

AZIMUTH: 270°, TILT: 20°

VICINITY MAP



JOB SITE



SYSTEM A

TOTAL SYSTEM SIZE	14.800 kWstc DC
	13.440 kWptc DC
	12.970 kW CEC DC
	11.995 kVA-AC max

SYSTEM B

TOTAL SYSTEM SIZE	33.300 kWstc DC
	30.240 kWptc DC
	29.484 kW CEC DC
	27.000 kVA-AC max

PROJECT TEAM

1ST LIGHT ENERGY
CONTRACTOR'S STATE LIC. NO. 921371
CLASSIFICATION: B, C-10, C-46
WORKER'S COMPENSATION: NATIONAL UNION FIRE INSURANCE COMPANY
POLICY NUMBER: 022298272
EXPIRATION DATE: 06/01/2023

AUTHORITY HAVING JURISDICTION (AHJ)

TOWN OF CARRBORO, NC
BUILDING DEPARTMENT
301 W MAIN ST
CARRBORO, NC 27510
PHONE 919.918.7324

UTILITY (ELECTRICAL)

ACCOUNT MANAGER
DUKE ENERGY

PROJECT COORDINATOR

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DESIGNER (ELECTRICAL)

CAROLYN CUYA
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Exp. Date: 12/31/2024
Date Certified and Signed: 05/30/2023

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of North Carolina.

License No. 051274, Expiration Date: 12/31/2024

ENGINEERING STAMP

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License No. 055765, Expiration Date: 12/31/2023

ENGINEERING STAMP

APPLICABLE CODES

ALL WORK SHALL CONFORM TO ALL PERTINENT CODES AND REGULATIONS;

- 2011 NC ELECTRICAL CODE
- 2012 NC BUILDING CODE
- 2012 NC ENERGY CONSERVATION CODE
- 2012 NC FIRE CODE
- 2012 NC FUEL GAS CODE
- 2012 NC MECHANICAL CODE
- 2012 NC PLUMBING CODE
- 2012 NC RESIDENTIAL CODE
- 2015 NC EXISTING BUILDING CODE

BUILDING INFO

CONSTRUCTION TYPE: V
NUMBER OF STORIES: 1
EXISTING OCCUPANCY TYPE: S
BUILDING SPRINKLERS: YES

DESIGN PARAMETERS

RISK CATEGORY: II
DESIGN WIND SPEED: 113 MPH (3-SEC GUST PER ASCE 7-16)
WIND EXPOSURE CATEGORY: C
GROUND SNOW LOAD: 15 PSF

TEMP. LOCATION: RALEIGH DURHAM INTERNATIONAL
MAX. TEMP. (°C): 36
MIN. TEMP. (°C): -12

GENERAL NOTES

- CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND LIABILITY FOR COMPLIANCE WITH REGULATIONS PER FEDERAL OSHA, AZ/ OSHA AND LOCAL REGULATIONS PERTAINING TO WORK PRACTICES, PROTECTION OF WORKERS AND VISITORS TO THE SITE.
- CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AT SITE PRIOR TO COMMENCING WORK.
- WORK REQUIRED UNDER THIS CONTRACT INCLUDES ALL LABOR AND MATERIALS, EQUIPMENT ETC. NECESSARY AND REASONABLY INCIDENTAL TO COMPLETE THE PROJECT. ALL MATERIALS SHALL BE IN NEW AND UNUSED CONDITION AND OF HIGH QUALITY IN EVERY RESPECT.
- MANUFACTURER'S MATERIAL, EQUIPMENT, ETC. SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
- THE CONTRACTOR SHALL BECOME FAMILIAR WITH ALL UTILITY AS-BUILT PLANS AND THE LOCATIONS OF ALL EXISTING UTILITIES AND STRUCTURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES, STRUCTURES, PAVEMENT OR IMPROVEMENTS.
- ALL WORK SHALL BE INSTALLED IN CONFORMANCE WITH ALL APPLICABLE LOCAL CODES AND ORDINANCES BY EXPERIENCED WORKERS AND A LICENSED CONTRACTOR WHO SHALL OBTAIN ALL NECESSARY PERMITS AND PAY ALL REQUIRED FEES.
- GOOD HOUSEKEEPING IS EXPECTED. TRASH SHALL BE REMOVED AS FREQUENTLY AS NEEDED TO ENSURE A TIDY AND SAFE WORK ENVIRONMENT.
- ALL WORK SHALL BE INSTALLED IN CONFORMANCE WITH CONSTRUCTION SPECIFICATIONS.
- ALL PV SYSTEM COMPONENTS SHALL BE LISTED BY A RECOGNIZED TESTING AGENCY.
- PV MODULES AND ASSOCIATED EQUIPMENT AND WIRING MATERIALS SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE DURING CONSTRUCTION.

SCOPE OF WORK

PROVIDE AND INSTALL A UTILITY INTERACTIVE ROOF MOUNTED PHOTOVOLTAIC SYSTEM CONSISTING OF THE LISTED EQUIPMENT:

SYSTEM A

ITEM	QTY	MODEL
PV MODULES	40	RENESOLA JC370S-24/Abw
RAPID SHUTDOWN	20	APSMART RSD-D-15
INVERTERS	1	FRONIUS SYMO 12.0-3 208 208V, 3φ
CUSTOMER MONITORING 'M-1'	1	ALSO ENERGY PL-400-CM
AC DISCONNECT 'AC-1'	1	SQUARE D (OR EQUIVALENT)
BACKFED PV BREAKER	1	SQUARE D (OR EQUIVALENT)

SYSTEM B

ITEM	QTY	MODEL
PV MODULES	90	RENESOLA JC370S-24/Abw
RAPID SHUTDOWN	45	APSMART RSD-D-15
INVERTERS	3	SOLIS 9.0kW INVERTER Solis-1P10K-4G-US 240VAC, 1φ
PANELBOARD 'PV-1'	1	SQUARE D (OR EQUIVALENT)
CUSTOMER MONITORING 'M-1'	1	LOCUS ENERGY LGATE 120
AC DISCONNECT 'AC-1'	1	SQUARE D (OR EQUIVALENT)
FUSING	2	BUSSMAN FRN-R-150
LINE TAPS	3	ILSCO IPC-250-4/0

Sheet List Table

Sheet Number	Sheet Title
G1.0	TITLE SHEET
G1.1	APPENDIX B FORMS (NC ONLY)
G1.2	ELECTRICAL SPECIFICATIONS, ABBREVIATIONS & SYMBOLS
C1.0	SITE PLAN
E1.0	SYSTEM A - SINGLE LINE & GROUNDING DIAGRAM
E1.1	SYSTEM B - SINGLE LINE & GROUNDING DIAGRAM
E2.0	ELECTRICAL LABELS
E2.1	MAP PLACARDS
E3.0	CONDUIT ROUTING & STRING WIRING PLAN
E4.0	EQUIPMENT DETAILS & EQUIPMENT ELEVATIONS
S1.0	ROOF ZONES AND SETBACKS
S1.1	MODULE MOUNTING & STRUCTURAL PLAN
S1.2	ATTACHMENT DETAILS

SUBMITTALS INDEX:

-SEE ATTACHED SUPPLEMENTAL BOOK

Plan Submittals

EXAMPLE
PV Generation System
>> Please See Attached Documents <<

Page	Description
1	Historical Calculations
2	Structural Calculations
3	Electrical Calculations
4	Component Data Sheets

PROVIDED BY: 1st Light Energy

APPROVALS - FOR OFFICIAL USE ONLY



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PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

TITLE SHEET

SHEET TITLE:

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022		C.C.
2	MATERIAL CHANGE	4/5/2023		C.C.

PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SCALE:	D
SCALE:	AS SHOWN
SHEET:	G1.0

PUBLISHED: 2023-Apr-05 11:28 AM

A

B

C

D

1st Light Energy

1

2

3

4

5

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of North Carolina.

License No. 055765, Expiration Date: 12/31/2023



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Exp. Date : 12/31/2023
Date Certified and Signed: 05/30/2023

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS (EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES) (Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: PUBLIC STORAGE #25905
Address: 515 S GREENSBORO ST, CARRBORO NC Zip Code 27510
Owner/Authorized Agent: _____ Phone # (____) _____ E-Mail _____
Owned By: City/County Private State
Code Enforcement Jurisdiction: City County State

CONTACT:				
DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE # E-MAIL
Architectural				
Civil				
Electrical	1ST LIGHT ENERGY		921371	(209)824-5500
Fire Alarm				
Plumbing				
Mechanical				
Sprinkler-Standpipe				
Structural				
Retaining Walls >5' High				
Other				

(*Other* should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

2018 NC BUILDING CODE: New Building Addition Renovation
 1st Time Interior Completion
 Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements
 Phased Construction - Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements

2018 NC EXISTING BUILDING CODE: EXISTING: Prescriptive Repair Chapter 14
Alteration: Level I Level II Level III
 Historic Property Change of Use

CONSTRUCTED: (date) _____ CURRENT OCCUPANCY(S) (Ch. 3): _____
RENOVATED: (date) _____ PROPOSED OCCUPANCY(S) (Ch. 3): _____

RISK CATEGORY (Table 1604.5): Current: I II III IV
Proposed: I II III IV

BASIC BUILDING DATA
Construction Type: I-A II-A III-A IV V-A
(check all that apply) I-B II-B III-B V-B
Sprinklers: No Partial Yes NFPA 13 NFPA 13R NFPA 13D
Standpipes: No Yes Class I II III Wd Dry
Fire District: No Yes **Flood Hazard Area:** No Yes
Special Inspections Required: No Yes (Contact the local inspection jurisdiction for additional procedures and requirements.)

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS STRUCTURAL DESIGN (PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

DESIGN LOADS:

Importance Factors: Snow (IS) _____
Seismic (IE) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ psf

Wind Load: Ultimate Wind Speed _____ 113 mph (ASCE-7)
Exposure Category _____ C

SEISMIC DESIGN CATEGORY: A B C D

Provide the following Seismic Design Parameters:
Risk Category (Table 1604.5) I II III IV
Spectral Response Acceleration SS _____ %g S1 _____ %g

Site Classification (ASCE 7) A B C D E F
Data Source: Field Test Presumptive Historical Data

Basic structural system Bearing Wall Dual w/Special Moment Frame
 Building Frame Dual w/Intermediate R/C or Special Steel
 Moment Frame Inverted Pendulum

Analysis Procedure: Simplified Equivalent Lateral Force Dynamic
Architectural, Mechanical, Components anchored? Yes No

LATERAL DESIGN CONTROL: Earthquake Wind

SOIL BEARING CAPACITIES:

Field Test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS ELECTRICAL DESIGN (PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Energy Code Performance Prescriptive
ASHRAE 90.1 Performance Prescriptive

Lighting schedule (each fixture type)

lamp type required in fixture
number of lamps in fixture
ballast type used in the fixture
number of ballasts in fixture
total wattage per fixture
total interior wattage specified vs. allowed (whole building or space by space)
total exterior wattage specified vs. allowed

Additional Efficiency Package Options (When using the 2018 NCECC; not required for ASHRAE 90.1)

- C406.2 More Efficient HVAC Equipment Performance
- C406.3 Reduced Lighting Power Density
- C406.4 Enhanced Digital Lighting Controls
- C406.5 On-Site Renewable Energy
- C406.6 Dedicated Outdoor Air System
- C406.7 Reduced Energy Use in Service Water Heating

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APN 9778839403

PROJECT NAME

APPENDIX B FORMS (NC ONLY)

SHEET TITLE

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022	C.C.	
2	MATERIAL CHANGE	4/5/2023	C.C.	

PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SIZE:	D
SCALE:	AS SHOWN
SHEET:	G1.1

ELECTRICAL SPECIFICATIONS

- 1. GENERAL
1.1. THE MATERIAL REQUIRED FOR THE WORK SHALL BE CONTRACTOR FURNISHED AND CONTRACTOR INSTALLED...
1.2. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS BEFORE SUBMITTING BID...
1.3. COORDINATE ALL WORK WITH OTHER TRADES...
1.4. ELECTRICAL EQUIPMENT LOCATIONS INDICATED ARE SHOWN DIAGRAMMATICALLY...
1.5. UNINTERRUPTED EXISTING ELECTRICAL POWER SHALL BE MAINTAINED...
1.6. INSTALLATION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODE.
1.7. INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION FIRE CODES (NFPA).
1.8. INSTALLATION OF THE SOLAR PHOTOVOLTAIC SYSTEM WILL BE IN ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODE.
2. CABLES AND CONDUCTORS
2.1. WIRE IN CONDUIT SHALL BE 90°C, 600 VOLT RATED, COPPER THWN-2, #12 AWG MINIMUM, OR AS NOTED.
2.2. EXPOSED WIRE FOR DC SYSTEMS SHALL BE 90°C, MIN. 1000 VOLT RATED, COPPER, PV WIRE, #12 AWG MINIMUM.
2.3. CABLES AND CONDUCTORS SHALL BE INSTALLED IN ACCORDANCE WITH NEC 300.4 AND 400.10.
2.4. PRESSURE LUGS, TERMINALS, CONNECTIONS, SPLICES AND OTHER WIRE TERMINATION DEVICES AND ACCESSORIES SHALL BE RATED 90°C AND FOR THE ENVIRONMENT WHERE INSTALLED.
2.5. WIRE IN CONDUIT RUN UNDERGROUND SHALL BE CONSIDERED TO BE IN A "WET ENVIRONMENT."
2.6. ALL WIRE SHALL BE MARKED OR STAMPED WITH MANUFACTURER'S NAME AND LOCATION.
3. RACEWAYS AND BOXES
3.1. CONDUIT CONCEALED IN WALLS OR ABOVE CEILINGS SHALL BE ELECTRIC METALLIC TUBING (EMT), ANSI STANDARD C80.3 AND UNDERWRITERS LABORATORIES STANDARD UL 797.
3.2. CONDUIT CONCEALED INSIDE THE BUILDING SHALL BE ELECTRIC METALLIC TUBING (EMT), ANSI STANDARD C80.3 AND UNDERWRITERS LABORATORIES STANDARD UL 797.
3.3. EXTERIOR CONDUIT EXPOSED SHALL BE ELECTRIC METALLIC TUBING (EMT), ANSI STANDARD C80.3 AND UNDERWRITERS LABORATORIES STANDARD UL 797.
3.4. EXTERIOR EXPOSED FLEXIBLE CONDUIT SHALL BE LIQUID-TIGHT FLEXIBLE METAL CONDUIT, CONSTRUCTED OF SINGLE STRIP, FLEXIBLE, CONTINUOUS, INTERLOCKED, AND DOUBLE-WRAPPED STEEL; GALVANIZED INSIDE AND OUTSIDE, COATED WITH LIQUID-TIGHT JACKET OF FLEXIBLE POLYVINYL CHLORIDE (PVC). IT SHALL CONFORM TO UL 360.
3.5. INTERIOR CONCEALED FLEXIBLE METAL CONDUIT AND/OR INTERIOR EXPOSED FLEXIBLE CONDUIT SHALL CONFORM TO UL 1.
3.6. FLEXIBLE CONDUIT SHALL BE USED FOR CONNECTION TO ALL EQUIPMENT WITH THE POTENTIAL FOR VIBRATION. CONNECTIONS SHALL NOT BE MORE THAN 6' LONG.
3.7. FITTINGS SHALL BE COMPRESSION TYPE, DIE CAST.
3.8. CONDUIT SHALL BE CONCEALED IN WALLS OR ABOVE CEILING WHERE POSSIBLE.
3.9. CONDUIT MOUNTED ON CEILING SHALL BE EXPOSED AND RUNS SHALL BE NEATLY MOUNTED PARALLEL TO BUILDING'S EXTERIOR WALLS.
3.10. BOXES IN INTERIOR LOCATIONS SHALL BE NEMA 1, OF THE TYPE, SHAPE, SIZE AND DEPTH TO SUIT EACH RESPECTIVE LOCATION.
3.11. DAMP, WET, EXTERIOR BOXES SHALL BE NEMA 3R OR BETTER, RAIN-TIGHT, DUST-TIGHT, WATER-TIGHT, WITH THREADED HUBS AND GASKETED COVERS. ALL ELECTRICAL RACEWAYS, COMPONENTS AND FITTINGS INSTALLED IN SUCH LOCATIONS SHALL COMPLY WITH WET LOCATION REQUIREMENTS. COVERS SHALL BE OF THE SAME RATING AS THE BOX AND SHALL BE FULLY GASKETED.

- 4. EXISTING EQUIPMENT AND CONDITIONS
4.1. DISCONNECT AND REMOVE ABANDONED/ NOT IN USE EQUIPMENT.
4.2. EXISTING EQUIPMENT AND ASSOCIATED APPURTENANCES SHALL BE PROTECTED IN PLACE UNLESS OTHERWISE NOTED ON THE PLANS.
4.3. PATCH AND REPAIR ALL OPENINGS LEFT BY DEMOLITION AND INSTALLATION TO MATCH EXISTING SURFACE FINISH.

- 5. GROUNDING
5.1. NON-CURRENT CARRYING METAL PARTS OF THE SYSTEM SHALL BE PROPERLY GROUNDED TO COMPLY WITH NEC REQUIREMENTS.
5.2. PROVIDE A GREEN COATED GROUND CONDUCTOR IN ALL CONDUITS WITH POWER CONDUCTORS.
5.3. PROVIDE A CONTINUOUS GROUND VIA A WEEB CONNECTING EACH PHOTOVOLTAIC MODULE TO THE ALUMINUM MOUNTING STRUCTURE. DISCONNECTION OF A PHOTOVOLTAIC MODULE SHALL NOT INTERRUPT THE SYSTEM GROUND.
5.4. GROUNDING CONNECTORS SHALL BE RATED FOR THE MATERIAL BEING GROUNDED.
5.5. ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS PER NEC 250.90 AND 250.96.
5.6. GROUND BUSHINGS SHALL BE PROVIDED AROUND PRE-PUNCHED CONCENTRIC KNOCKOUTS ON THE DC SIDE OF THE SYSTEM PER NEC 250.97.
5.7. THE GROUNDING ELECTRODE SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 COPPER WIRE PER NEC 250.64 B.
5.8. ALL GROUNDING ELECTRODE CONDUCTORS SHALL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER NEC 250.64 C.
6. MONITORING
6.1. WIRE SHALL BE RS-485, NOT LONGER THAN 2000'.
6.2. RS-485 CONDUCTOR SHALL BE #18 AWG STRANDED OR BETTER, 2 TWISTED-PAIRS.
6.3. RS-485 SHIELD SHALL BE FOIL WRAPPED 100% COVERAGE AND/OR TINNED COPPER BRAID 90% COVERAGE.
7. BASIC MATERIALS AND METHODS
7.1. EQUIPMENT SHALL BE LISTED, LABELED OR CERTIFIED FOR ITS USE BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), AS RECOGNIZED BY THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.
7.2. BUSSING FOR PANEL BOARDS AND SWITCHBOARDS SHALL BE COPPER.
7.3. PANEL BOARDS SHALL HAVE HINGED DOORS, BOTH INTERIOR AND EXTERIOR. UNDERWRITERS LABORATORIES STANDARD UL 797. COMPONENTS AND FITTINGS INSTALLED IN SUCH LOCATIONS SHALL COMPLY WITH WET LOCATION REQUIREMENTS. COVERS SHALL BE OF THE SAME RATING AS THE BOX AND SHALL BE FULLY GASKETED. COVERS SHALL BE OF THE SCREW ON TYPE.
7.4. PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS SHALL NOT BE CONTAINED IN THE SAME RACEWAY, CABLE TRAY, CABLE, OUTLET BOX, JUNCTION BOX, OR SIMILAR FITTING AS FEEDERS OR BRANCH CIRCUITS OF OTHER SYSTEMS, UNLESS THE CONDUCTORS OF THE DIFFERENT SYSTEMS ARE SEPARATED BY A PARTITION OR ARE CONNECTED TOGETHER. CEC 690.4(B).
7.5. DC CONDUCTORS ROUTED INSIDE BUILDING SHALL BE CONTAINED IN ELECTRIC METALLIC CONDUIT.
7.6. ALL EXTERIOR EQUIPMENT SHALL BE RATED NEMA 3R OR HIGHER.
8. IDENTIFICATION AND LABELING
8.1. PLACARDS AS MAY BE REQUIRED SHALL BE METAL OR PLASTIC, WITH ENGRAVED OR MACHINE PRINTED LETTERS, OR ELECTRO-PHOTO PLATING, IN A "RED" BACKGROUND (WARNING) OR "BLACK" BACKGROUND (INFORMATION) WITH "WHITE" LETTERING, A MINIMUM OF 1/8" LETTER HEIGHT, AND ALL CAPITAL LETTERS.
8.2. PLACARDS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS, SCREWS, OR APPROVED ADHESIVE.
8.3. MATERIAL USED FOR MARKINGS SHALL BE WEATHER RESISTANT (I.E. ENGRAVED PLASTIC). UL 969 SHALL BE USED AS A STANDARD FOR WEATHER RATING.
8.4. MARKINGS SHALL BE PLACED EVERY 5' ON CENTER ON ALL INTERIOR AND EXTERIOR DC CONDUITS, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES AT TURNS, ABOVE/BELOW PENETRATIONS, ALL DC COMBINERS, AND JUNCTION BOXES. MARKINGS SHALL READ: "CAUTION: SOLAR CIRCUIT - DC VOLTAGE."

STANDARD COLOR PHASING FOR CONDUCTORS OF DIFFERENT AC & DC
Table with columns for AC CONDUCTORS (3PH 277/ 480V, 3PH 120/ 208V & 1PH 120/ 240 VOLT) and DC CONDUCTORS (DC NEGATIVE GROUNDED INVERTERS, DC UNGROUNDED INVERTERS).

- NOTES:
1. ON 240V DELTA SUPPLY, PHASE B IS TYPICAL "STINGER LEG" (1PH 208V TO GROUND), USE ORANGE WIRE OR MARK BLACK WIRE W/ ORANGE.
2. CONDUCTORS LARGER THAN #6 AWG MAY HAVE SOLID COLOR PHASED INSULATION OR BE BLACK W/ THE CORRECT COLOR PHASE TAPE MARKINGS.
3. CONDUCTORS LARGER THAN #6 AWG USING BLACK INSULATION SHALL BE MARKED AT ENDS AND ALL PULL ENCLOSURES WITH A MINIMUM OF 4" AND MAXIMUM OF 6" PHASE TAPE MARKING.
4. CONDUCTORS #6 AWG AND SMALLER SHALL USE THE CORRECT COLOR PHASE SOLID INSULATION.

SYMBOLS

- AUTO TRIPPING CONTACTOR SWITCH (NORMALLY CLOSED)
BOLT SWITCH
CHASSIS GROUND
CIRCUIT BREAKER
COMBINER
CONDUIT TURNED DOWN
CONDUIT TURNED UP
CONTACTOR
CURRENT TRANSFORMER (CT)
DC-AC INVERTER
DETAIL
EARTH GROUND
(E) ELECTRICAL PANEL OR CABINET
ENLARGED DETAIL
FUSE
FUSE PULL
FUSED SWITCH
GENERATOR
GROUND WIRING
KILOWATT HOUR/ DEMAND METER (FURNISHED BY UTILITY)
LUG
(N) CONDUIT RUN, EXPOSED ON ROOF OR WALL
(N) CONDUIT RUN, UNDERGROUND
(N) ELECTRICAL PANEL OR CABINET
PHOTOVOLTAIC MODULE
PHOTOVOLTAIC ARRAY
SECTION
SKYLIGHT
T-HANDLE SWITCH (NORMALLY CLOSED)
TRANSFORMER (HI-LEG DELTA)
TRANSFORMER (DELTA/ WYE)
TRANSFORMER (ISOLATED)
TRANSFORMER (SPLIT PHASE)
WEATHER STATION
KEY NOTE
EQUIPMENT TAG

ABBREVIATIONS

- AMPERE
ALTERNATING CURRENT
AMP FRAME, AMP FUSED
ABOVE FINISH FLOOR
AMPS INTERRUPTING CURRENT
AMBIENT
AMERICAN NATIONAL STANDARDS INSTITUTE
APPROXIMATE
AMP TRIP
AUTO TRANSFER SWITCH
AVERAGE
AMERICAN WIRE GAUGE
BUILDING
BALANCE OF SYSTEM
CONDUIT
CALIFORNIA CATALOG
CATEGORY V ETHERNET CABLE
CIRCUIT BREAKER
CALIFORNIA ELECTRICAL CODE
CIRCUIT CLEARS
COMBINER BOX COMMUNICATION
CONSTRUCTION CONTINUOUS, CONTINUED
CONTROL COPPER
DIRECT CURRENT
DEGREE
DISCONNECT
DISTANCE
EACH
EQUIPMENT GROUNDING CONDUCTOR
ELECTRICAL
ELEVATION
EMBEDMENT
ELECTRIC METALLIC TUBING ENCLOSURE
EQUAL, EQUIPMENT
ESTIMATED
EQUIPMENT EXPANSION
FIRE ALARM FULL LOAD AMPS FOOT
GROUND GALVANIZED
GROUNDING ELECTRODE CONDUCTOR
GENERATOR
GROUND FAULT CURRENT INTERRUPTER
GROUND FAULT INTERRUPTER
HORSE POWER
HERTZ
CURRENT
CURRENT MAX POWER
INVERTER
CURRENT SHORT CIRCUIT
JUNCTION BOX
THOUSAND AMPS
THOUSAND AMPS INTERRUPT CURRENT
THOUSAND CIRCULAR MILS
THOUSAND VOLTS
BASIC IMPULSE LEVEL (KV)
THOUSAND VOLT-AMPS
KILOWATTS
LOCAL AREA NETWORK
POUND(S)
LONG TIME CONTINUOUS LOAD
LENGTH
METER
MANUAL
MAXIMUM
MAIN BREAKER
MINIMUM CURRENT AMPS
MECHANICAL
MINIMUM
MISCELLANEOUS
MAIN LUG ONLY
METER MAIN
MAXIMUM OVER-CURRENT PROTECTION
MOUNTING
MAIN SWITCH BOARD

ENGINEERINC
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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of North Carolina.
License No. 055765, Expiration Date: 12/31/2023

- NATIONAL ELECTRICAL CODE
NEUTRAL
NATIONAL FIRE PROTECTION ASSOCIATION
NET GENERATION OUTPUT METER
NOT IN CONTRACT
NUMBER
NOMINAL
NATIONALLY RECOGNIZED TESTING LABORATORY
NOT TO SCALE
ON CENTER
OVER-CURRENT PROTECTIVE DEVICES
PLUG, POLE, PUMP AS APPROPRIATE
PULL BOX
PIGGY BACK CARD
POINT OF COMMON COUPLING
PACIFIC GAS & ELECTRIC
PHASE
PANEL
POINT OF CONNECTION
PERSONAL PROTECTIVE EQUIPMENT
PACIFIC POWER & LINES
PHOTOVOLTAIC
POLYVINYL CHLORIDE
REFERENCE
REVENUE GRADE METER
RIGID STEEL CONDUIT
ROOM
RAPID SHUTDOWN DEVICE
SOUTHERN CALIFORNIA EDISON
SAN DIEGO GAS & ELECTRIC
SOLID NEUTRAL
SERIAL NUMBER
SQUARE
SAFETY SWITCH
STANDARD
STRUCTURAL
SWITCHBOARD
SWITCHGEAR
TEMPERATURE
TURLOCK IRRIGATION DISTRICT
TYPICAL
UNLESS OTHERWISE NOTED
UNDERGROUND PULL SECTION
UNDERWRITER'S LABORATORY
VOLTS
VOLT-AMPS
VOLTS ALTERNATING CURRENT
VOLTS DIRECT CURRENT
WATTS
WEATHERPROOF
TRANSFORMER
WYE
AND
DEGREE CELSIUS
DEGREE FAHRENHEIT
EQUAL
EXISTING
FEET
INCHES
MINUS
NEW
NUMBER OF ITEMS
PERCENT
PLUS
PLUS OR MINUS
PROPERTY LINE

1ST LIGHT
1989 MOFFAT BOULEVARD, HANTECA CA 95338
P. 209.824.5500 F. 209.824.5275 WWW.1STLIGHTENERGY.COM
NORTH CAROLINA PROFESSIONAL SEAL 055765
Exp. Date : 12/31/2023 Date Certified and Signed: 05/30/2023

PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

ELECTRICAL SPECIFICATIONS, ABBREVIATIONS & SYMBOLS

Table with columns: REVISIONS (REV#, DESCRIPTION, DATE, DESIGNER, C.C.), PROJECT # (1001360), DESIGNED BY (C.C.), CHECKED BY (F.L.), DATE (10/28/2022), SCALE (AS SHOWN), SHEET (G1.2)

PUBLISHED: 2023-Apr-05 11:28 AM
PROJECT NAME:
SHEET TITLE:
1st Light Energy

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License No. 055765, Expiration Date: 12/31/2023



1989 MOFFAT BOULEVARD, MANTECA CA 95336
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WWW.1STLIGHTENERGY.COM



Exp. Date : 12/31/2023
Date Certified and Signed: 05/30/2023

PROJECT NAME:
PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

PROJECT NAME:

SITE PLAN

SHEET TITLE:

REV #	DESCRIPTION	DATE	DESIGNER
1	INITIAL PLANSET	10/28/2022	C.C.
2	MATERIAL CHANGE	4/5/2023	C.C.

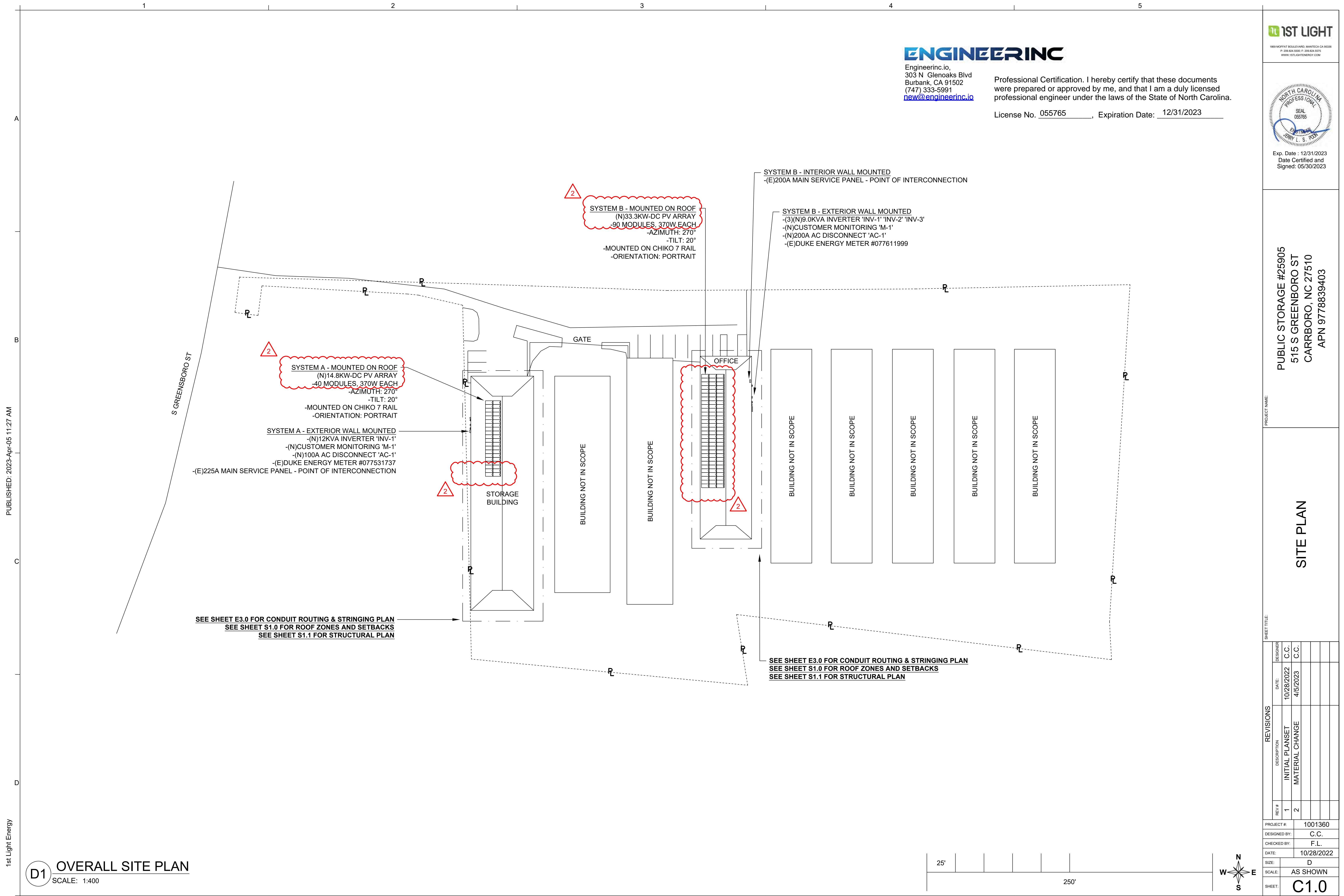
PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SCALE:	D
SHEET:	AS SHOWN
	C1.0

PUBLISHED: 2023-Apr-05 11:27 AM

1st Light Energy

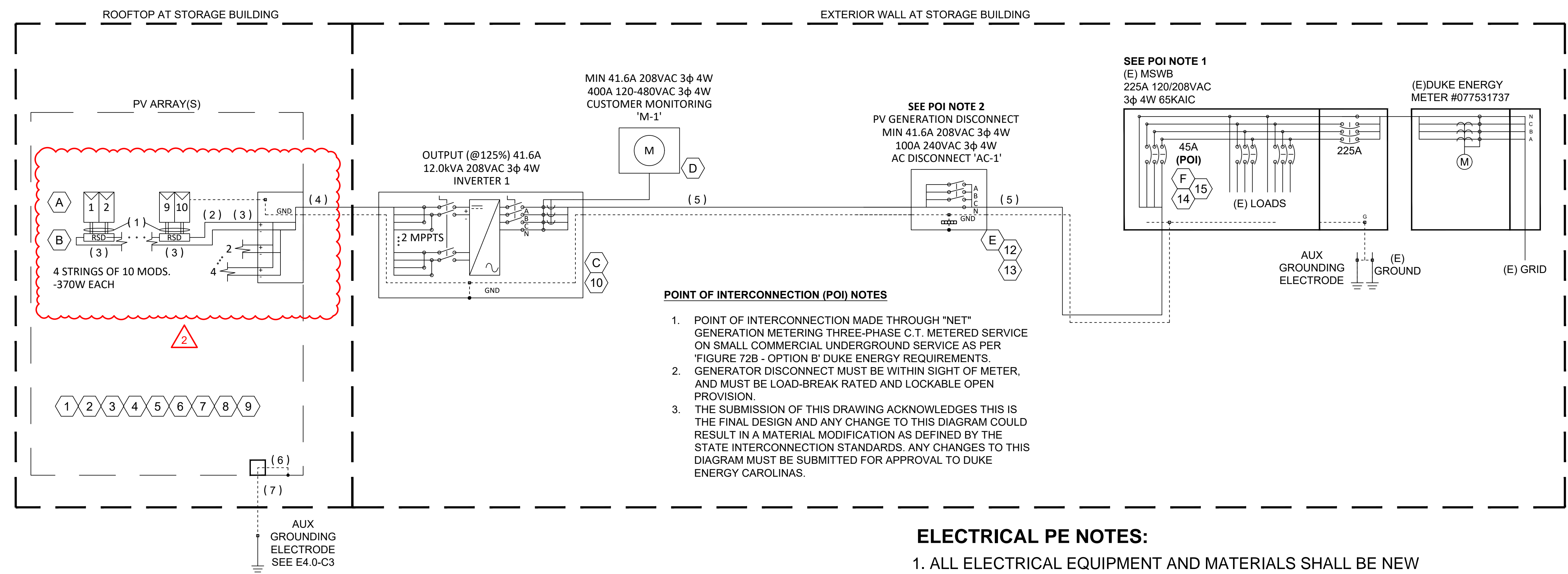
D1 OVERALL SITE PLAN

SCALE: 1:400



PUBLISHED: 2023-Apr-05 11:28 AM

1st Light Energy



- POINT OF INTERCONNECTION (POI) NOTES**
- POINT OF INTERCONNECTION MADE THROUGH "NET" GENERATION METERING THREE-PHASE C.T. METERED SERVICE ON SMALL COMMERCIAL UNDERGROUND SERVICE AS PER 'FIGURE 72B - OPTION B' DUKE ENERGY REQUIREMENTS.
 - GENERATOR DISCONNECT MUST BE WITHIN SIGHT OF METER, AND MUST BE LOAD-BREAK RATED AND LOCKABLE OPEN PROVISION.
 - THE SUBMISSION OF THIS DRAWING ACKNOWLEDGES THIS IS THE FINAL DESIGN AND ANY CHANGE TO THIS DIAGRAM COULD RESULT IN A MATERIAL MODIFICATION AS DEFINED BY THE STATE INTERCONNECTION STANDARDS. ANY CHANGES TO THIS DIAGRAM MUST BE SUBMITTED FOR APPROVAL TO DUKE ENERGY CAROLINAS.

ELECTRICAL PE NOTES:

- ALL ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE NEW AND LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED ELECTRICAL TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.
- ALL WORK SHALL COMPLY WITH THE STATE OF NORTH CAROLINA, AND ALL CARRBORO, APPLICABLE CODES AND REGULATIONS.
- ALL ELECTRICAL EQUIPMENT SHALL BE UL LISTED OR LISTED BY A CITY OF CARRBORO, RECOGNIZED ELECTRICAL LABORATORY OR APPROVED BY THE DEPARTMENT.
- ALL EQUIPMENT SHALL BE GROUNDED PER NATIONAL ELECTRICAL CODE.

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License No. 055765, Expiration Date: 12/31/2023

ID	ITEM	QTY	MODEL	SPECIFICATIONS
A	PV MODULES	40	RENESOLA 1C370S-24/Abw	370WSTC, 336.0WPtc, 1956X992X40MM, 1000V MAX SYSTEM VDC, 72 CELL
B	RAPID SHUTDOWN	20	APSMART RSD-D-15	25A, 120V, 1500V-DC SYSTEM, 250MM CABLE, MC4
C	INVERTERS	1	FRONIUS SYMO 12.0-3 208 208V, 3φ	12.0KVA, 208V, 3φ, 4W, CEC EFF 96.5%, W/ INTEGRATED AC & DC DISCONNECT INTEGRATED SUNSPEC PLC FOR RAPID SHUTDOWN
D	CUSTOMER MONITORING 'M-1'	1	ALSO ENERGY PL-400-CM	400A, ENERGY METER 120-480V, 3φ, W/ SOLID CORE CT'S, 4G CELL MODEM
E	AC DISCONNECT 'AC-1'	1	SQUARE D (OR EQUIVALENT)	100A, 240VAC, 3-POLE, NON-FUSIBLE, HD, NEUTRAL, NEMA3R
F	BACKFED PV BREAKER	1	SQUARE D (OR EQUIVALENT)	45A, 208VAC, 3-POLE

C1 EQUIPMENT SCHEDULE
SCALE: NTS

INV	STRING ID	KWstc	# RSD	# MODS
1	1.1.1	3.700	5	10
	1.1.2	3.700	5	10
	1.2.1	3.700	5	10
	1.2.2	3.700	5	10
TOTAL		14.800	20	40

D1 ARRAY SCHEDULE
SCALE: NTS

TOTAL SYSTEM SIZE	
14.800 kWstc DC	
13.440 kWptc DC	
12.970 kW CEC DC	
11.995 kVA-AC max	

D2 SYSTEM SIZE
SCALE: NTS

PV INTERCONNECTION METHOD	
MAIN OCPD RATING	225.0 AMPS
EXISTING MAIN BUSBAR RATING	225.0 AMPS
120% MAXIMUM BUSBAR AMPACITY ALLOWED PER NEC 705.12(B)(2)(3)(b)	270.0 AMPS
125% OF PV OUTPUT CIRCUIT CURRENT	41.6 AMPS
MAXIMUM CURRENT ON MAIN BUSBAR = (125% PV OUTPUT CURRENT + MAIN OCPD RATING)	266.6 AMPS
MAXIMUM CURRENT ON MAIN BUSBAR IS ≤ 270 AMPS AND IS ACCEPTABLE. PV OCPD MUST BE INSTALLED AT OPPOSITE END OF BUSBAR FROM MAIN OCPD	

C3 PV INTERCONNECTION METHOD
SCALE: NTS

CIRCUIT	DESCRIPTION	SPECIFICATION
(1)	MODULE TO MODULE	Free-Air w/ (2) 12 AWG CU PVWire, (1) 6 AWG CU THWN2 GEC
(2)	INTER ARRAY JUMPER (IF NEEDED)	(1) 1" EMT w/ (2) 10 AWG CU PVWire, (1) 6 AWG CU THWN2 GEC
(3)	STRING(S) TO ARRAY EDGE	Free-Air w/ (2) 10 AWG CU PVWire, (1) 6 AWG CU Bare GEC
(4)	ARRAY EDGE TO INVERTER	(1) 1" EMT w/ (4) 10 AWG CU THWN2, (1) 6 AWG CU THWN2 GEC
(5)	INVERTER TO MAIN	(1) 1" EMT w/ (4) 8 AWG CU THWN2, (1) 6 AWG CU THWN2 GEC
(6)	AUXILIARY ARRAY GROUND	Free-Air w/ (1) 6 AWG CU Bare GEC
(7)	AUXILIARY ARRAY GROUND	(1) ½" EMT w/ (1) 6 AWG CU THWN2 GEC
NOTE: (#) INDICATES THE NUMBER OF CONDUITS OR CONDUCTORS IN EACH CIRCUIT		

D3 CIRCUIT SCHEDULE
SCALE: NTS

GENERAL NOTES

- REFERENCE ELECTRICAL CALCULATIONS AND DATASHEETS IN SUBMITTAL BOOK.
- REFERENCE SHEET E2.1 FOR ELECTRICAL PLACARDS.
- ALL EQUIPMENT IS NEW WORK EXCEPT WHERE NOTED (E).
- FIELD TO VERIFY ALL EQUIPMENT TERMINATIONS ARE RATED 75°C OR HIGHER.

KEY NOTES

- MINIMUM 4" DISTANCE BETWEEN CONDUIT AND ROOF SURFACE SEE DETAIL E4.0-B5
- REFERENCE DETAIL E1.0-D1 TABLE FOR ALL ARRAY CONFIGURATION INFORMATION.
- REFERENCE DETAIL E4.0-B1,B2 FOR PV MODULE TO RAPID SHUTDOWN DEVICE (RSD) WIRING.
- #12 AWG PV WIRE SHALL HAVE NO MORE THAN 6 WIRES BUNDLED IN FREE-AIR UNDER THE ARRAY.
#10 AWG PV WIRE SHALL HAVE NO MORE THAN 6 WIRES BUNDLED IN FREE-AIR UNDER THE ARRAY.
#8 AWG PV WIRE SHALL HAVE NO MORE THAN 4 WIRES BUNDLED IN FREE-AIR UNDER THE ARRAY.
- EACH ARRAY SHALL HAVE ADDITIONAL AUXILIARY ARRAY GROUNDING CONDUCTOR PER 690.47(D) AND SHALL BE PROVIDED AND BE SIZED PER 250.52 AND 250.54. OPTION TO RUN IN CONDUIT AS SHOWN OR IN SEPARATE 1/2" CONDUIT. SEE DETAIL E4.0-C3 FOR GROUND ROD DETAIL.
- SEE PAGE G1.1-D4 FOR CONDUCTOR COLOR SPECIFICATIONS.
- ALL RACEWAYS INCLUDE A WIRE TYPE EQUIPMENT GROUNDING CONDUCTOR THAT SERVES AS BOTH GEC AND EGC PER 250.121 EXCEPTION.
- ALL METALLIC RACEWAYS CONTAINING A GEC SHALL BE BONDED AT BOTH ENDS. EVERY GEC SHALL BE IRREVERSIBLY SPLICED AT EACH JOINT PER 250.64(C)(1). SEE DETAIL E4.0-A2.
- PROVIDE AND INSTALL A CONTINUOUS CONDUCTOR FROM THE RSD STRINGS TO EACH ASSIGNED COMBINER/INVERTER. SPLICES SHALL NOT BE ALLOWED, NO EXCEPTION.
- DC SYSTEM IS UNGROUNDED TYPE.
- NOT USED.
- AC DISCONNECT SHALL BE VISIBLE, LOCKABLE, AND ACCESSIBLE. NOTE: IT SHALL BE A KNIFE BLADE TYPE DISCONNECT.
- INVERTER(S) PROVIDE NEC 690.12 COMPLIANT RAPID SHUTDOWN AT RSD OUTPUT CIRCUIT (#3). RAPID SHUTDOWN OF THE ENTIRE PV GENERATION SYSTEM CAN BE PERFORMED AT DISCONNECT 'AC-1'. ALL DC CONDUCTORS ARE 'CONTROLLED' PER NEC 690.12(2) AND CAN BE OF ANY LENGTH.
- SEE TABLE E1.0-C3 FOR PV INTERCONNECTION DETAILS.
- PV INTERCONNECTION MADE PER 705.12(B)(2)(3)(b) '120% RULE'.



Exp. Date : 12/31/2023
Date Certified and Signed: 05/30/2023

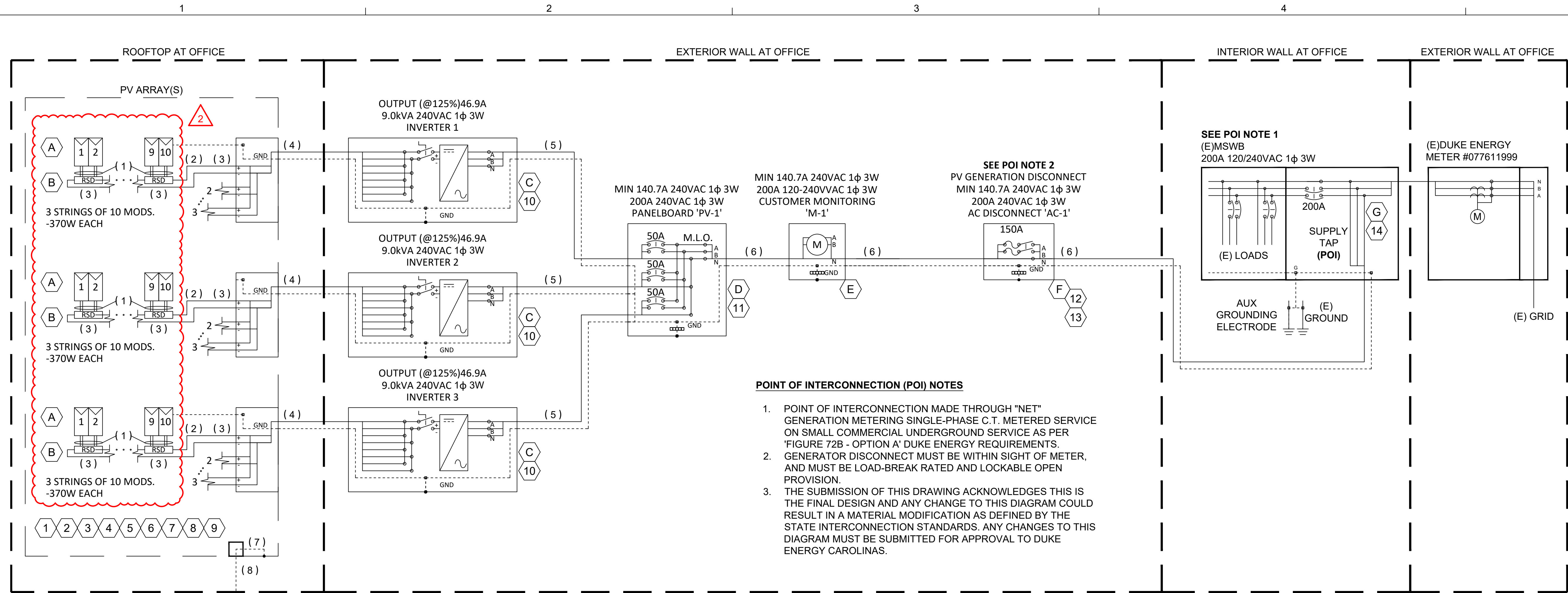
PROJECT NAME:
PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

SHEET TITLE:
SYSTEM A - SINGLE LINE & GROUNDING DIAGRAM

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022		
2	MATERIAL CHANGE	4/5/2023		

PROJECT #: 1001360
DESIGNED BY: C.C.
CHECKED BY: F.L.
DATE: 10/28/2022
SCALE: AS SHOWN
SHEET: **E1.0**

PUBLISHED: 2023-Apr-05 11:28 AM



POINT OF INTERCONNECTION (POI) NOTES

- POINT OF INTERCONNECTION MADE THROUGH "NET" GENERATION METERING SINGLE-PHASE C.T. METERED SERVICE ON SMALL COMMERCIAL UNDERGROUND SERVICE AS PER 'FIGURE 72B - OPTION A' DUKE ENERGY REQUIREMENTS.
- GENERATOR DISCONNECT MUST BE WITHIN SIGHT OF METER, AND MUST BE LOAD-BREAK RATED AND LOCKABLE OPEN PROVISION.
- THE SUBMISSION OF THIS DRAWING ACKNOWLEDGES THIS IS THE FINAL DESIGN AND ANY CHANGE TO THIS DIAGRAM COULD RESULT IN A MATERIAL MODIFICATION AS DEFINED BY THE STATE INTERCONNECTION STANDARDS. ANY CHANGES TO THIS DIAGRAM MUST BE SUBMITTED FOR APPROVAL TO DUKE ENERGY CAROLINAS.

ELECTRICAL PE NOTES:

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- ALL WORK SHALL COMPLY WITH THE STATE OF NORTH CAROLINA, AND ALL CARRBORO, APPLICABLE CODES AND REGULATIONS.
- ALL ELECTRICAL EQUIPMENT SHALL BE UL LISTED OR LISTED BY A CITY OF CARRBORO, RECOGNIZED ELECTRICAL LABORATORY OR APPROVED BY THE DEPARTMENT.
- ALL EQUIPMENT SHALL BE GROUNDED PER NATIONAL ELECTRICAL CODE.



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License No. 055765, Expiration Date: 12/31/2023

ID	ITEM	QTY	MODEL	SPECIFICATIONS
A	PV MODULES	90	RENESOLA JC370S-24/Abw	370WSTC, 336.0WPtc, 1956X992X40MM, 1000V MAX SYSTEM VDC, 72 CELL
B	RAPID SHUTDOWN	45	APSMART RSD-D-15	25A, 120V, 1500V-DC SYSTEM, 250MM CABLE, MICA
C	INVERTERS	3	SOLIS 9.0kW INVERTER Solis-1P10K-4G-US 240VAC, 1φ	9.0KVA, 240VAC, 1φ, 3W, CEC EFF 97.5%, W/ INTEGRATED DC DISCONNECT BUILT-IN CERTIFIED SUNSPEC OR TIGO TRANSMITTER
D	PANELBOARD 'PV-1'	1	SQUARE D (OR EQUIVALENT)	200A, 240VAC, 1φ, 3W, NEMA 3R MAIN BREAKER: NONE 03 SLOTS, BREAKERS: 50A/50A/50A
E	CUSTOMER MONITORING 'M-1'	1	LOCUS ENERGY LGATE 120	200A, 120-480V, 1φ, NEMA 3R, 2S SOCKET, 4G CELL MODEM
F	AC DISCONNECT 'AC-1'	1	SQUARE D (OR EQUIVALENT)	200A, 240VAC, 2-POLE, FUSIBLE, HD, NEUTRAL, NEMA3R
G	FUSING	2	BUSSMAN FRN-R-150	150A, 240VAC, 200KAIC, TIME-DELAY FUSE
G	LINE TAPS	3	ILSCO IPC-250-4/0	260A, 600V, MAIN: 250KCMIL-12, TAP: 4/0-6

C1 EQUIPMENT SCHEDULE

SCALE: NTS

INV	STRING ID	KWstc	# RSD	# MODS
1	1.1.1	3.700	5	10
	1.2.1	3.700	5	10
	1.3.1	3.700	5	10
2	2.1.1	3.700	5	10
	2.2.1	3.700	5	10
	2.3.1	3.700	5	10
3	3.1.1	3.700	5	10
	3.2.1	3.700	5	10
	3.3.1	3.700	5	10
TOTAL		33.300	45	90

D1 ARRAY SCHEDULE

SCALE: NTS

TOTAL SYSTEM SIZE	
33.300 kWstc DC	
30.240 kWptc DC	
29.484 kW CEC DC	
27.000 kVA-AC max	

D2 SYSTEM SIZE

SCALE: NTS

CIRCUIT	DESCRIPTION	SPECIFICATION
(1)	MODULE TO MODULE	Free-Air w/ (2) 12 AWG CU PVWire, (1) 6 AWG CU THWN2 GEC
(2)	INTER ARRAY JUMPER (IF NEEDED)	(1) 1" EMT w/ (2) 10 AWG CU PVWire, (1) 6 AWG CU THWN2 GEC
(3)	STRING(S) TO ARRAY EDGE	Free-Air w/ (2) 10 AWG CU PVWire, (1) 6 AWG CU Bare GEC
(4)	ARRAY EDGE TO INVERTER	(1) 1" EMT w/ (6) 10 AWG CU THWN2, (1) 6 AWG CU THWN2 GEC
(5)	INVERTER TO PANELBOARD PV-1	(1) 1" EMT w/ (3) 6 AWG CU THWN2, (1) 6 AWG CU THWN2 GEC
(6)	PANELBOARD PV-1 TO MAIN 1	(1) 2" EMT w/ (3) 2/0 AWG CU THWN2, (1) 4 AWG CU THWN2 GEC
(7)	AUXILIARY ARRAY GROUND	Free-Air w/ (1) 6 AWG CU Bare GEC
(8)	AUXILIARY ARRAY GROUND	(1) 1/2" EMT w/ (1) 6 AWG CU THWN2 GEC

NOTE: (#) INDICATES THE NUMBER OF CONDUITS OR CONDUCTORS IN EACH CIRCUIT

D3 CIRCUIT SCHEDULE

SCALE: NTS

GENERAL NOTES

- REFERENCE ELECTRICAL CALCULATIONS AND DATASHEETS IN SUBMITTAL BOOK.
- REFERENCE SHEET E2.1 FOR ELECTRICAL PLACARDS.
- ALL EQUIPMENT IS NEW WORK EXCEPT WHERE NOTED (E).
- FIELD TO VERIFY ALL EQUIPMENT TERMINATIONS ARE RATED 75°C OR HIGHER.

KEY NOTES

- MINIMUM 4" DISTANCE BETWEEN CONDUIT AND ROOF SURFACE SEE DETAIL E4.0-B5
- REFERENCE DETAIL E1.0-D1 TABLE FOR ALL ARRAY CONFIGURATION INFORMATION.
- REFERENCE DETAIL E4.0-B1,B2 FOR PV MODULE TO RAPID SHUTDOWN DEVICE (RSD) WIRING.
- #12 AWG PV WIRE SHALL HAVE NO MORE THAN 6 WIRES BUNDLED IN FREE-AIR UNDER THE ARRAY. #10 AWG PV WIRE SHALL HAVE NO MORE THAN 6 WIRES BUNDLED IN FREE-AIR UNDER THE ARRAY. #8 AWG PV WIRE SHALL HAVE NO MORE THAN 4 WIRES BUNDLED IN FREE-AIR UNDER THE ARRAY.
- EACH ARRAY SHALL HAVE ADDITIONAL AUXILIARY ARRAY GROUNDING CONDUCTOR PER 690.47(D) AND SHALL BE PROVIDED AND BE SIZED PER 250.52 AND 250.54. OPTION TO RUN IN CONDUIT AS SHOWN OR IN SEPARATE 1/2" CONDUIT. SEE DETAIL E4.0-C3 FOR GROUND ROD DETAIL.
- SEE PAGE G1.1-D4 FOR CONDUCTOR COLOR SPECIFICATIONS.
- ALL RACEWAYS INCLUDE A WIRE TYPE EQUIPMENT GROUNDING CONDUCTOR THAT SERVES AS BOTH GEC AND EGC PER 250.121 EXCEPTION.
- ALL METALLIC RACEWAYS CONTAINING A GEC SHALL BE BONDED AT BOTH ENDS. EVERY GEC SHALL BE IRREVERSIBLY SPLICED AT EACH JOINT PER 250.64(C)(1). SEE DETAIL E4.0-A2.
- PROVIDE AND INSTALL A CONTINUOUS CONDUCTOR FROM THE RSD STRINGS TO EACH ASSIGNED COMBINER/INVERTER. SPLICES SHALL NOT BE ALLOWED, NO EXCEPTION.
- DC SYSTEM IS UNGROUNDED TYPE.
- PV-1 LOAD CENTER CONFORMS TO 705.12(B)(2)(3)(C) THE SUM OF ALL BREAKERS<= AMPACITY OF BUS BAR.
- AC DISCONNECT SHALL BE VISIBLE, LOCKABLE, AND ACCESSIBLE. NOTE: IT SHALL BE A KNIFE BLADE TYPE DISCONNECT.
- INVERTER(S) PROVIDE NEC 690.12 COMPLIANT RAPID SHUTDOWN AT RSD OUTPUT CIRCUIT (#3). RAPID SHUTDOWN OF THE ENTIRE PV GENERATION SYSTEM CAN BE PERFORMED AT DISCONNECT 'AC-1'. ALL DC CONDUCTORS ARE 'CONTROLLED' PER NEC 690.12(2) AND CAN BE OF ANY LENGTH.
- PV INTERCONNECTION MADE PER 705.12(A) ' SUPPLY SIDE'



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Exp. Date: 12/31/2023
Date Certified and Signed: 05/30/2023

PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

PROJECT NAME
SYSTEM B - SINGLE LINE & GROUNDING DIAGRAM

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022		
2	MATERIAL CHANGE	4/5/2023		

PROJECT #: 1001360
DESIGNED BY: C.C.
CHECKED BY: F.L.
DATE: 10/28/2022
SCALE: AS SHOWN
SHEET: **E1.1**

PUBLISHED: 2023-Apr-05 11:28 AM

WARNING: PHOTOVOLTAIC POWER SOURCE

690.31 (G)(3)&(4).

REFLECTIVE STICKER TO BE INSTALLED ON PV CONDUITS EVERY 5'-0"

A1 CONDUIT LABELS

SCALE: 1" = 1"

WARNING
DC JUNCTION BOX

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

B1 J-BOX AND PULL BOX LABELS

SCALE: 1" = 1"

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

WARNING
PHOTOVOLTAIC POWER SOURCE

690.31 (G) (3)

WARNING
ARC FLASH AND SHOCK HAZARD
Appropriate PPE Required

Do not operate controls or open covers without appropriate personal protection equipment.
Failure to comply may result in injury or death!

Refer to NFPA 70E for minimum PPE requirements

D1 PV SUBPANEL LABELS

SCALE: 1" = 1"

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License No. 055765, Expiration Date: 12/31/2023

INVERTER

SYSTEM A - 'INV-1'

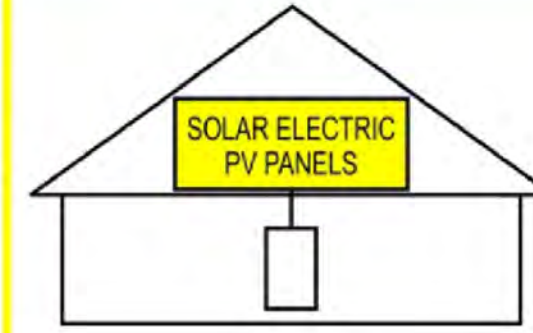
MAXIMUM VOLTAGE 529.9V
MAXIMUM CIRCUIT CURRENT 61.31A
MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED) N.A.

SYSTEM B - 'INV-1'

MAXIMUM VOLTAGE 532.8V
MAXIMUM CIRCUIT CURRENT 45.98A
MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED) N.A.

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

WARNING
ARC FLASH AND SHOCK HAZARD
Appropriate PPE Required

Do not operate controls or open covers without appropriate personal protection equipment.
Failure to comply may result in injury or death!

Refer to NFPA 70E for minimum PPE requirements

D3 INVERTER LABELS

SCALE: 1" = 1"

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

SYSTEM A - 'AC-1'

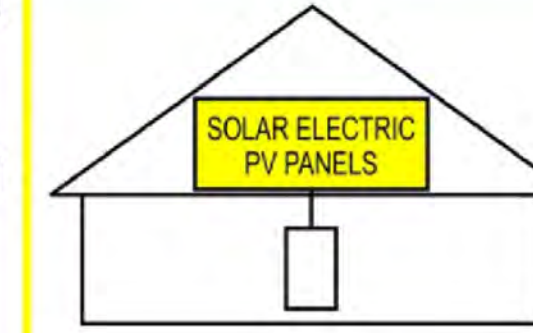
PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT 33.3A
NOMINAL OPERATING AC VOLTAGE 208 V

SYSTEM B - 'AC-1'

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT 112.5A
NOMINAL OPERATING AC VOLTAGE 240V

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

WARNING
ARC FLASH AND SHOCK HAZARD
Appropriate PPE Required

Do not operate controls or open covers without appropriate personal protection equipment.
Failure to comply may result in injury or death!

Refer to NFPA 70E for minimum PPE requirements

D4 AC DISCONNECT LABELS

SCALE: 1" = 1"

GENERAL NOTES

1. ALL LABELS ARE PRESENTED ACTUAL SIZE.

CAUTION
SOLAR POINT OF CONNECTION

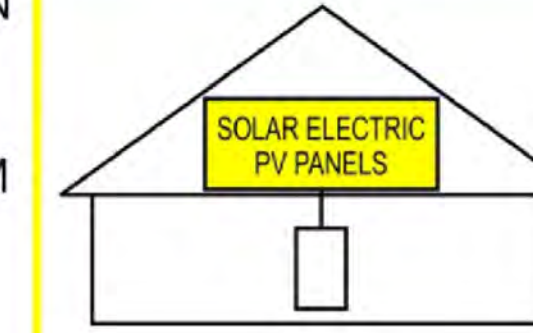
WARNING
SOLAR ELECTRIC BREAKER IS BACKFED

SYSTEM A - PV BREAKER

PHOTOVOLTAIC SYSTEM
AC DISCONNECT
RATED AC OUTPUT CURRENT 33.3A
NOMINAL OPERATING AC VOLTAGE 208 V

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



SYSTEM A - PV BREAKER

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

WARNING
ARC FLASH AND SHOCK HAZARD
Appropriate PPE Required

Do not operate controls or open covers without appropriate personal protection equipment.
Failure to comply may result in injury or death!

Refer to NFPA 70E for minimum PPE requirements

D5 MAIN SERVICE PANEL LABELS

SCALE: 1" = 1"

1ST LIGHT

1800 MOFFAT BOULEVARD, MANTENCA CA 95036
P: 209.824.5500 F: 209.824.5275
WWW.1STLIGHTENERGY.COM



Exp. Date: 12/31/2023
Date Certified and Signed: 05/30/2023

PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

PROJECT NAME

ELECTRICAL LABELS

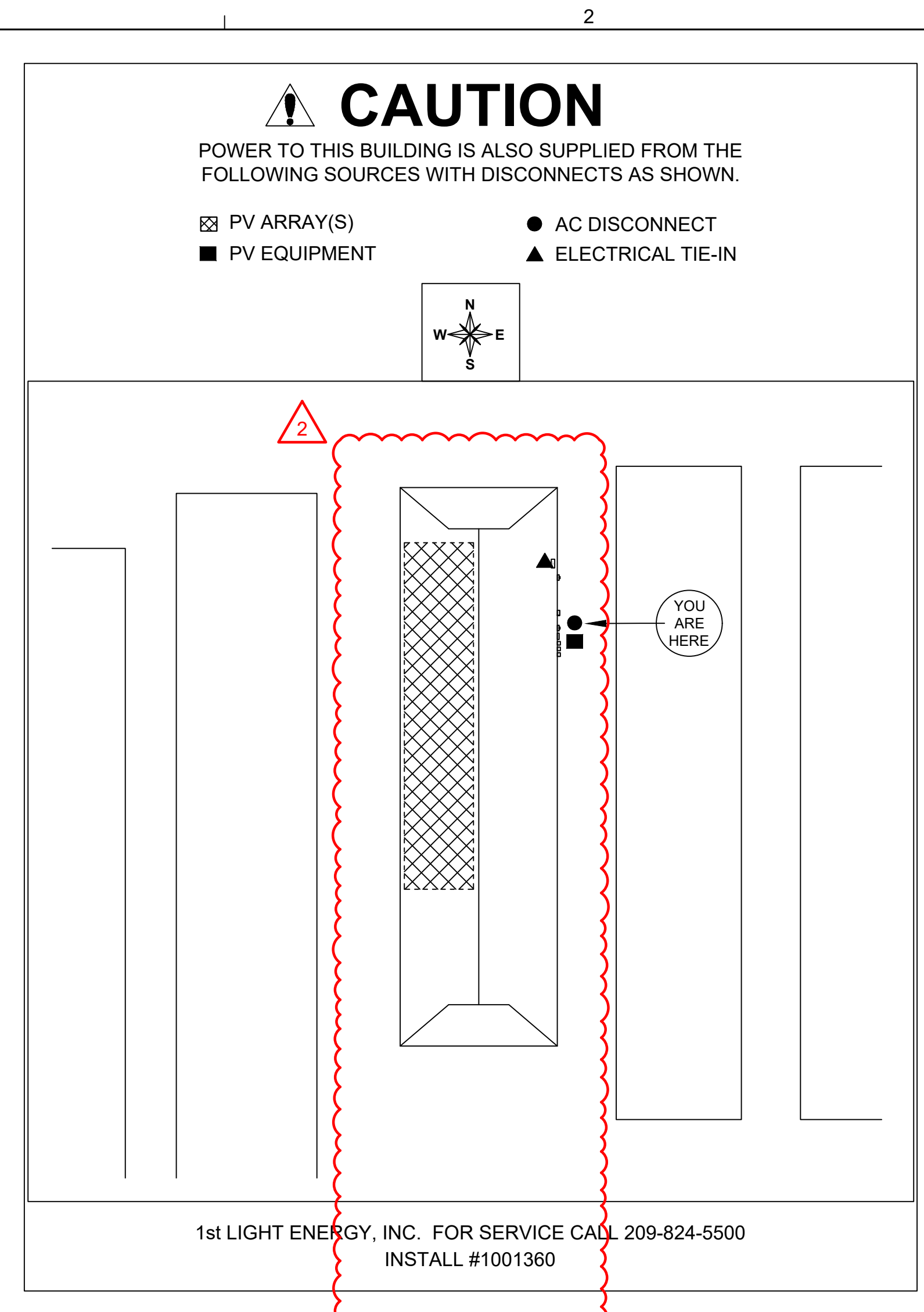
SHEET TITLE

REV#	DESCRIPTION	DESIGNER	DATE	C.C.
1	INITIAL PLANSET		10/28/2022	
2	MATERIAL CHANGE		4/5/2023	

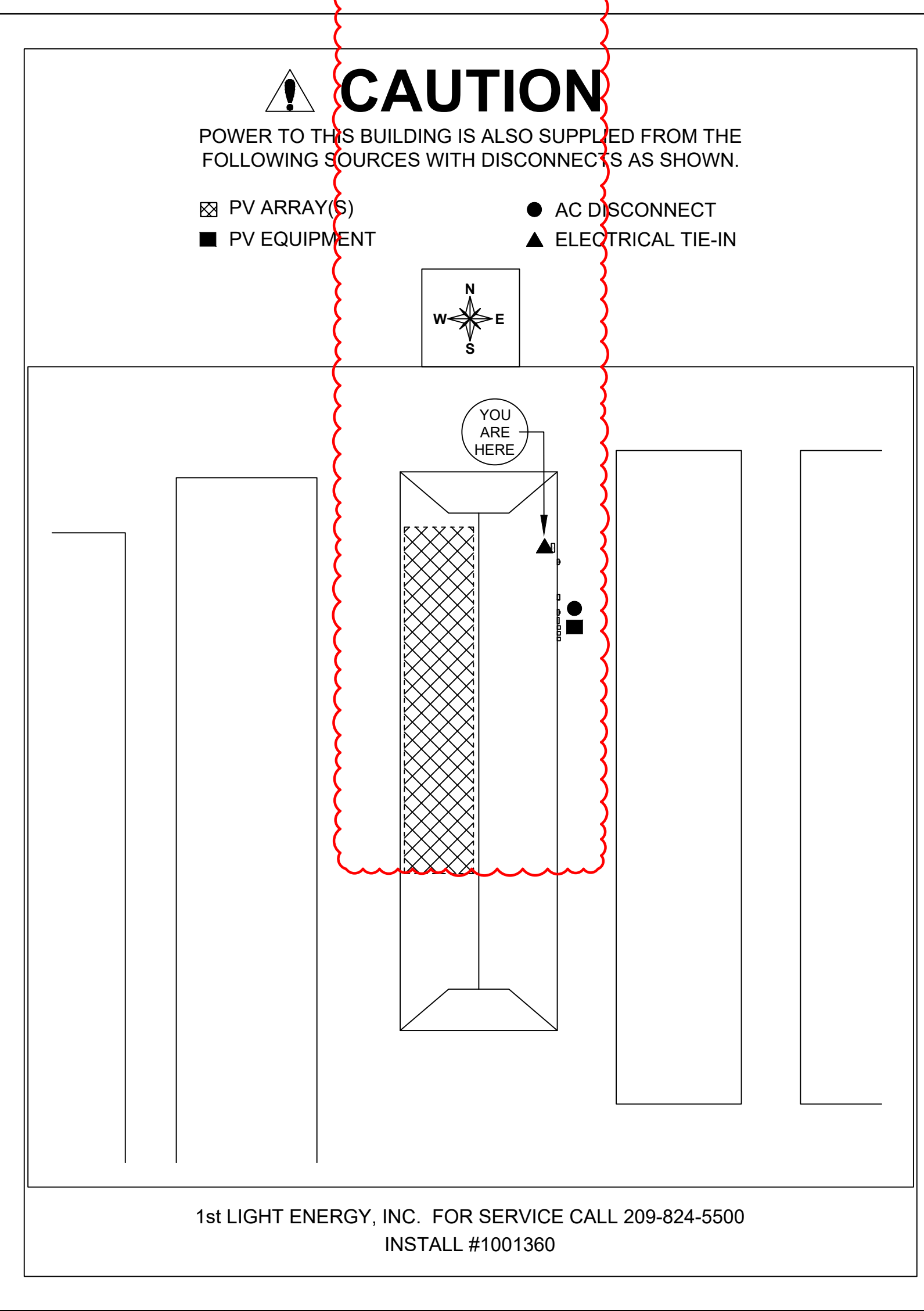
PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SIZE:	D
SCALE:	AS SHOWN
SHEET:	E2.0

PUBLISHED: 2023-Apr-05 11:28 AM

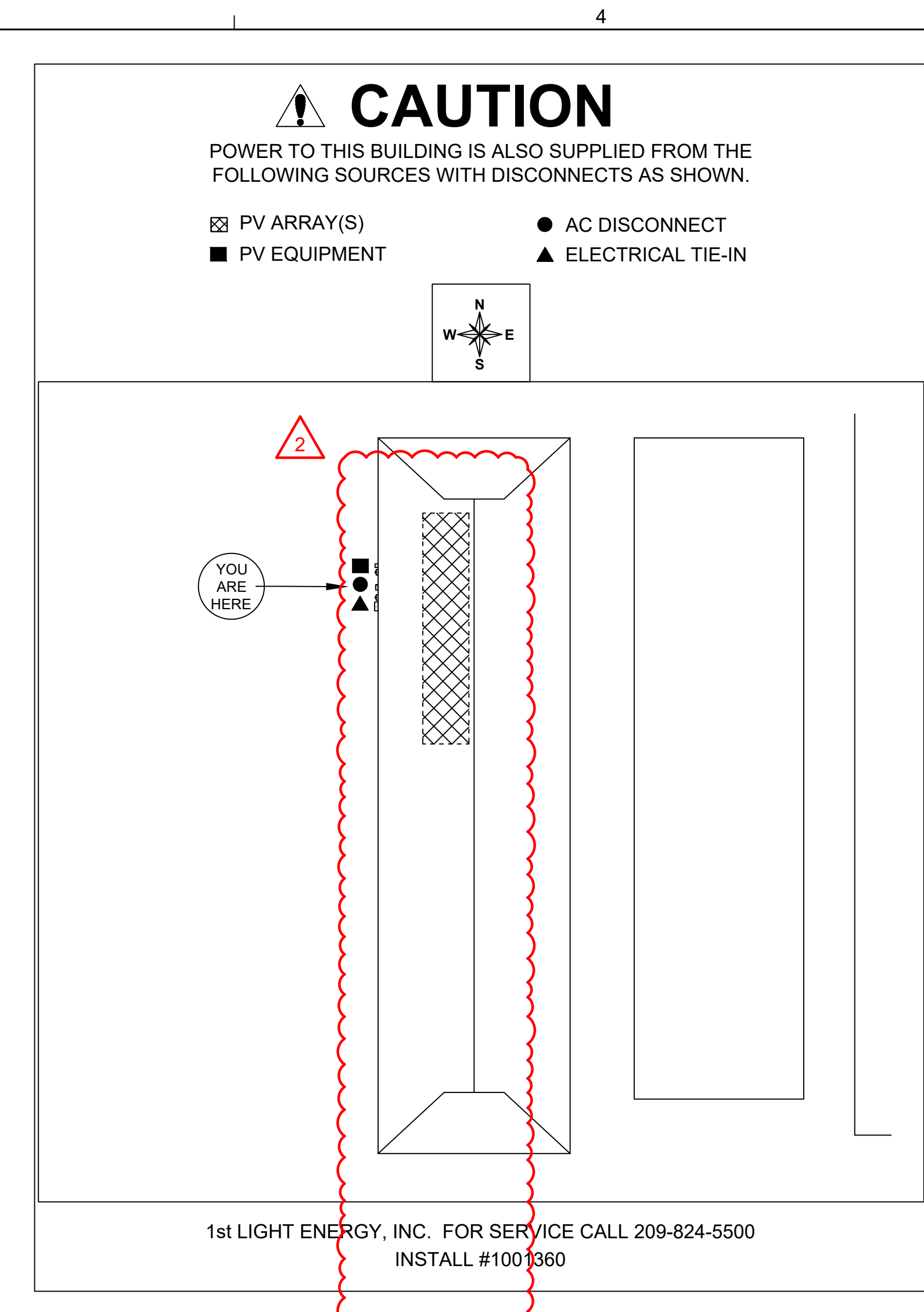
B1 SYSTEM 'B' AC-1
SCALE: 1" = 1"



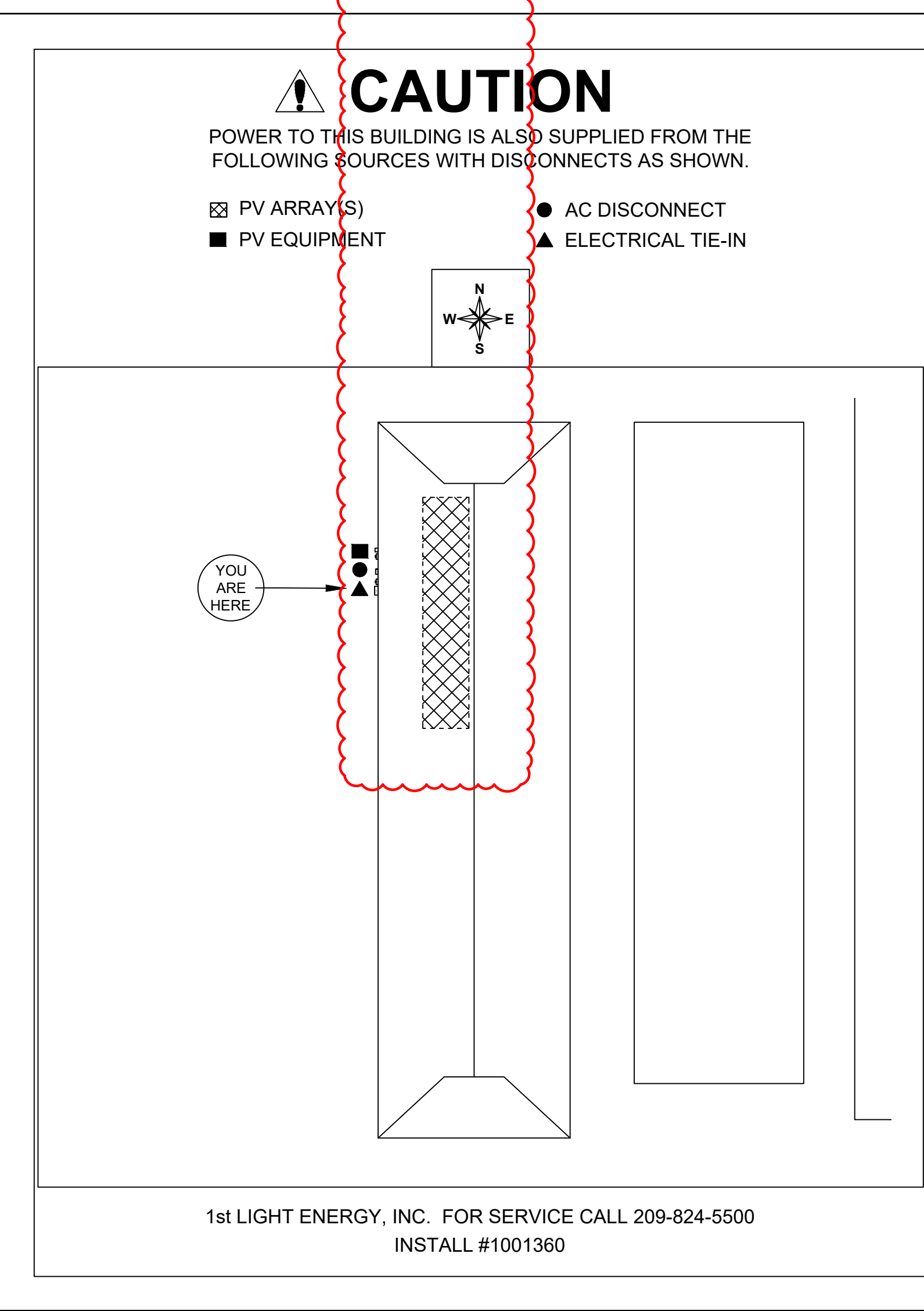
D1 SYSTEM 'B' MSWB
SCALE: 1" = 1"



B3 SYSTEM 'A' AC-1
SCALE: 1" = 1"



D3 SYSTEM 'A' MSWB
SCALE: 1" = 1"



GENERAL NOTES

1. ALL PLACARDS ARE PRESENTED ACTUAL SIZE.

ENGINEERING INC.
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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of North Carolina

License No. 055765, Expiration Date: 12/31/2023

MAP PLACARDS

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022		C.C.
2	MATERIAL CHANGE	4/5/2023		C.C.

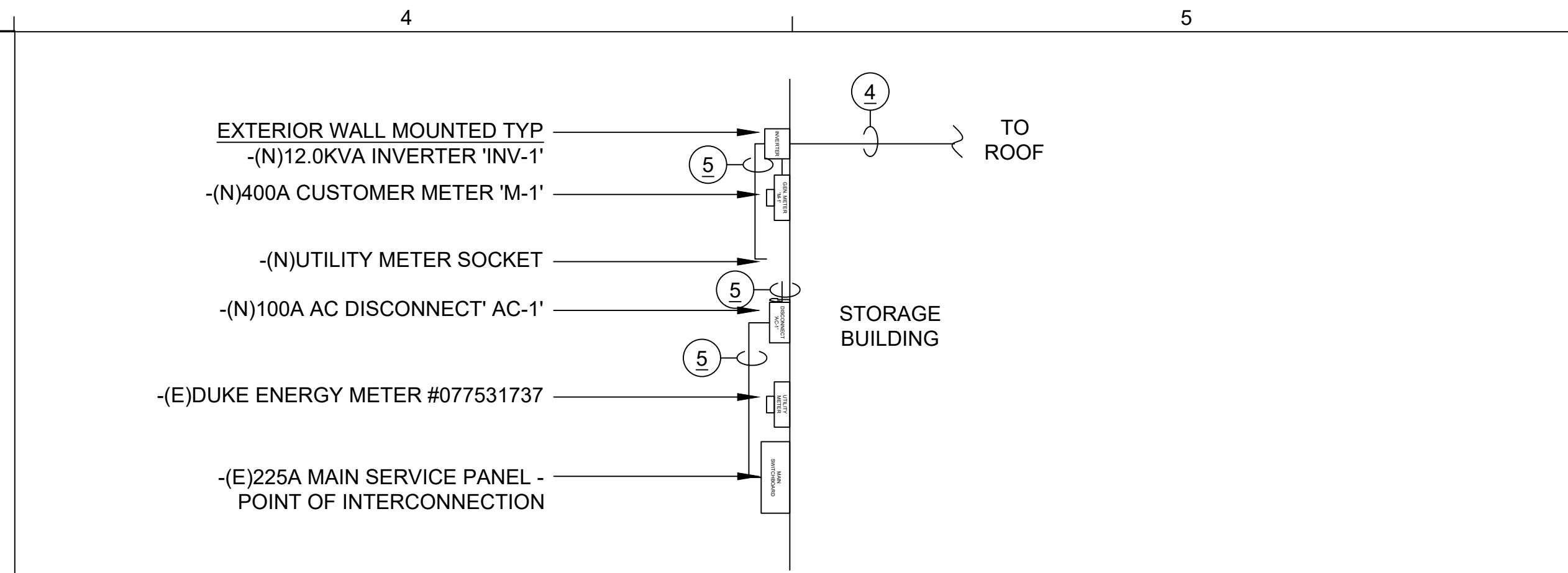
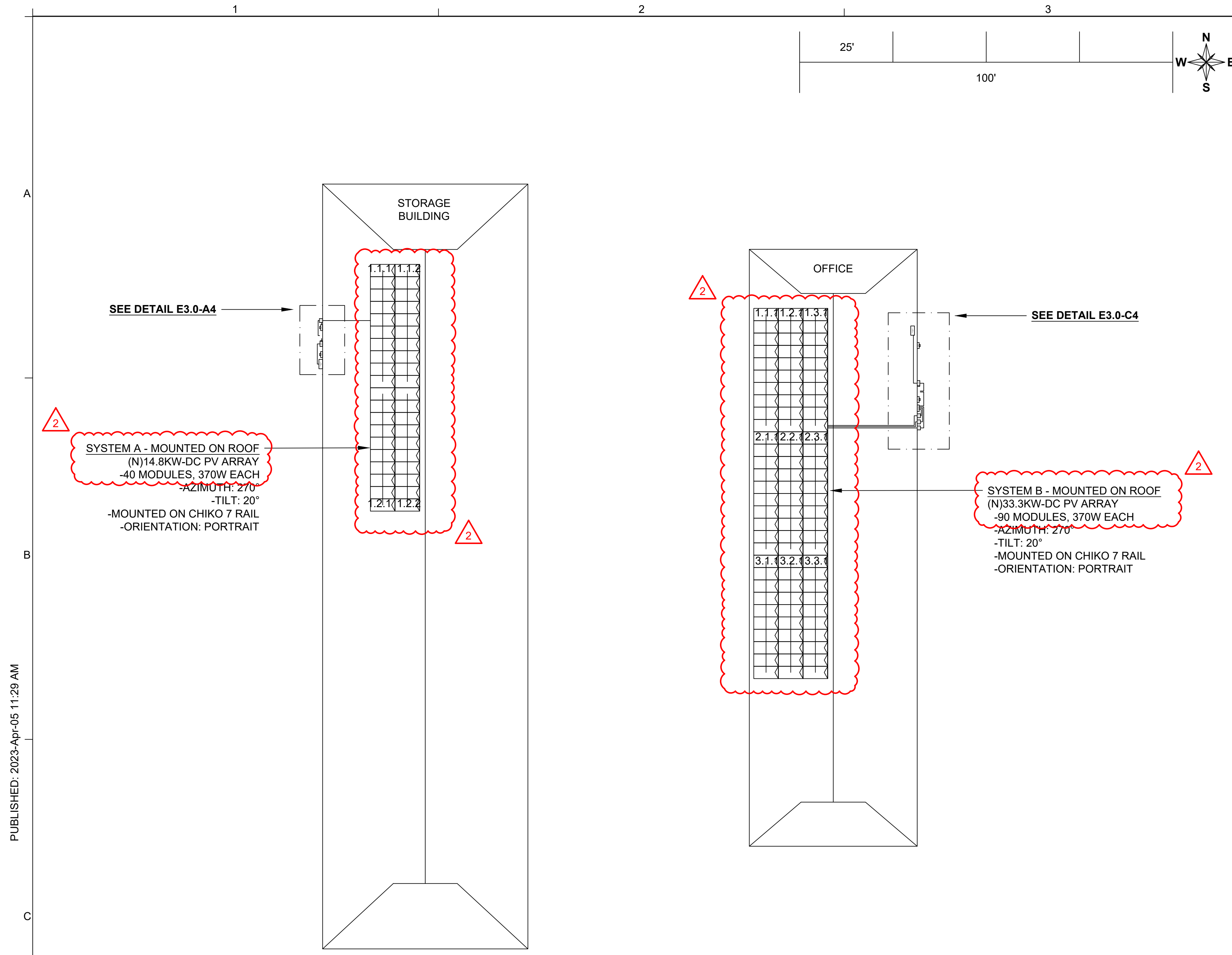
PROJECT #: 1001360
DESIGNED BY: C.C.
CHECKED BY: F.L.
DATE: 10/28/2022
SCALE: AS SHOWN
SHEET: E2.1

1ST LIGHT
1909 MOFFAT BOULEVARD, MANTENCA CA 95358
P: 209.824.5500 F: 209.824.5275
WWW.1STLIGHTENERGY.COM

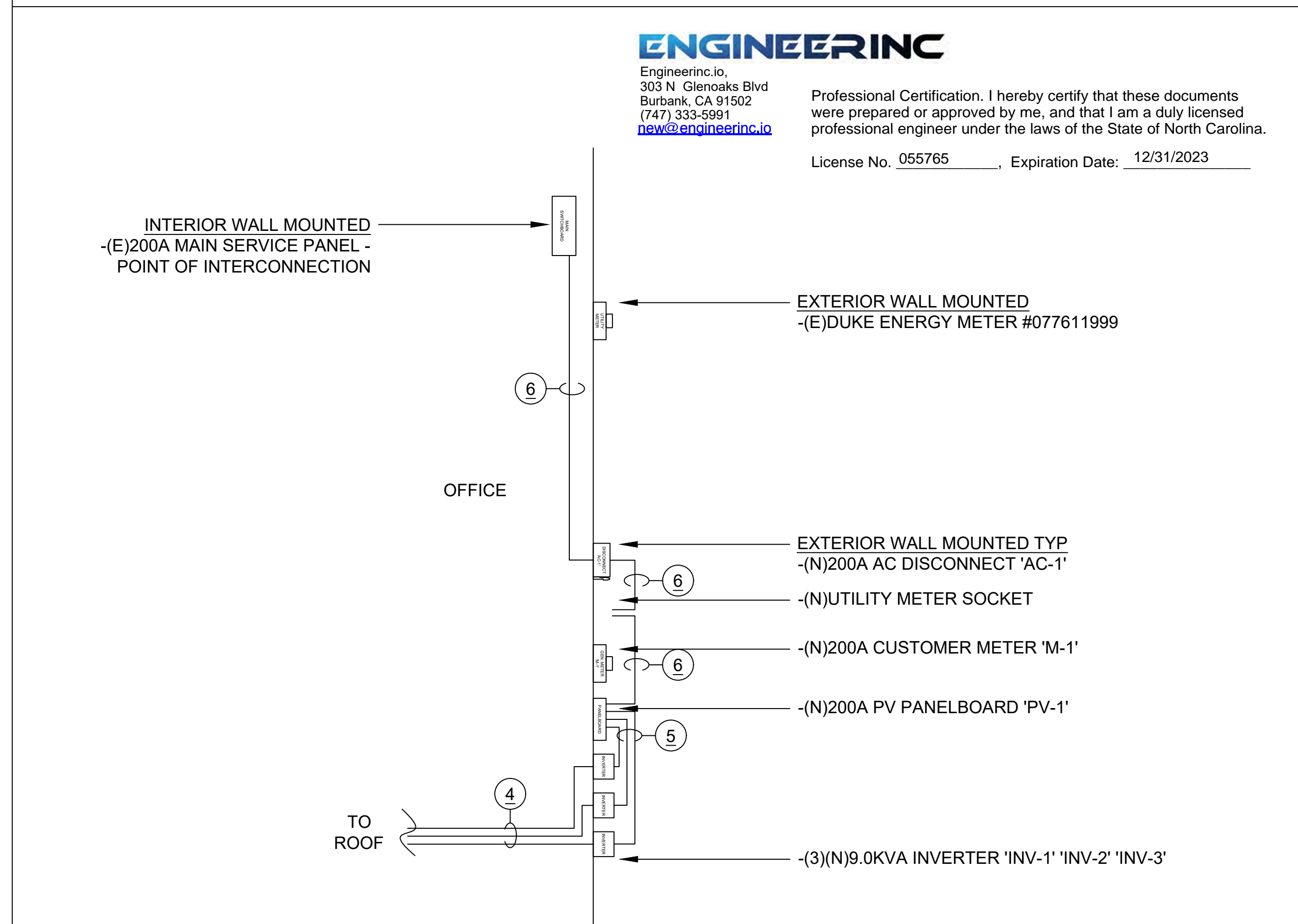
ENGINEERING INC.
Professional Engineer
SEAL 055765
ERRY L. S. POE

Exp. Date: 12/31/2023
Date Certified and Signed: 05/30/2023

PROJECT NAME: PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403



A4 SYSTEM A - CONDUIT ROUTING
SCALE: 1:50



C4 SYSTEM B - CONDUIT ROUTING
SCALE: 1:50

C1 SYSTEM A - CONDUIT ROUTING & STRING PLAN
SCALE: 1:200

C2 SYSTEM B - CONDUIT ROUTING & STRING PLAN
SCALE: 1:200

SYSTEM A

INV	STRING ID	KWstc	# RSD	# MODS
1	1.1.1	3.700	5	10
	1.1.2	3.700	5	10
	1.2.1	3.700	5	10
	1.2.2	3.700	5	10
TOTAL		14.800	20	40

SYSTEM B

INV	STRING ID	KWstc	# RSD	# MODS
1	1.1.1	3.700	5	10
	1.2.1	3.700	5	10
2	2.1.1	3.700	5	10
	2.2.1	3.700	5	10
3	3.1.1	3.700	5	10
	3.2.1	3.700	5	10
	3.3.1	3.700	5	10
TOTAL		33.300	45	90

D1 ARRAY SCHEDULE
SCALE: N.T.S.

SYSTEM A

CIRCUIT	DESCRIPTION	CONDUIT	MAX DIST. (FT.) BETWEEN FIXED BOXES	MAX LEN. (FT.) RUN WITH 4" EXP. FITTING
1	MODULE TO MODULE	Free-Air		
2	INTER ARRAY JUMPER (IF NEEDED)	(1) 1" EMT	27'	438'
3	STRING(S) TO ARRAY EDGE	Free-Air		
4	ARRAY EDGE TO INVERTER	(1) 1" EMT	27'	438'
5	INVERTER TO MAIN	(1) 1" EMT	27'	438'
6	AUXILIARY ARRAY GROUND	Free-Air		
7	AUXILIARY ARRAY GROUND	(1) ½" EMT	22'	356'

SYSTEM B

CIRCUIT	DESCRIPTION	CONDUIT	MAX DIST. (FT.) BETWEEN FIXED BOXES	MAX LEN. (FT.) RUN WITH 4" EXP. FITTING
1	MODULE TO MODULE	Free-Air		
2	INTER ARRAY JUMPER (IF NEEDED)	(1) 1" EMT	27'	425'
3	STRING(S) TO ARRAY EDGE	Free-Air		
4	ARRAY EDGE TO INVERTER	(1) 1" EMT	27'	425'
5	INVERTER TO PANELBOARD PV-1	(1) 1" EMT	27'	425'
6	PANELBOARD PV-1 TO MAIN 1	(1) 2" EMT	27'	425'
7	AUXILIARY ARRAY GROUND	Free-Air		
8	AUXILIARY ARRAY GROUND	(1) ½" EMT	22'	347'

D2 CONDUIT SCHEDULE
SCALE: N.T.S.



Exp. Date : 12/31/2023
Date Certified and Signed: 05/30/2023

PROJECT NAME:
PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

CONDUIT ROUTING & STRING WIRING PLAN

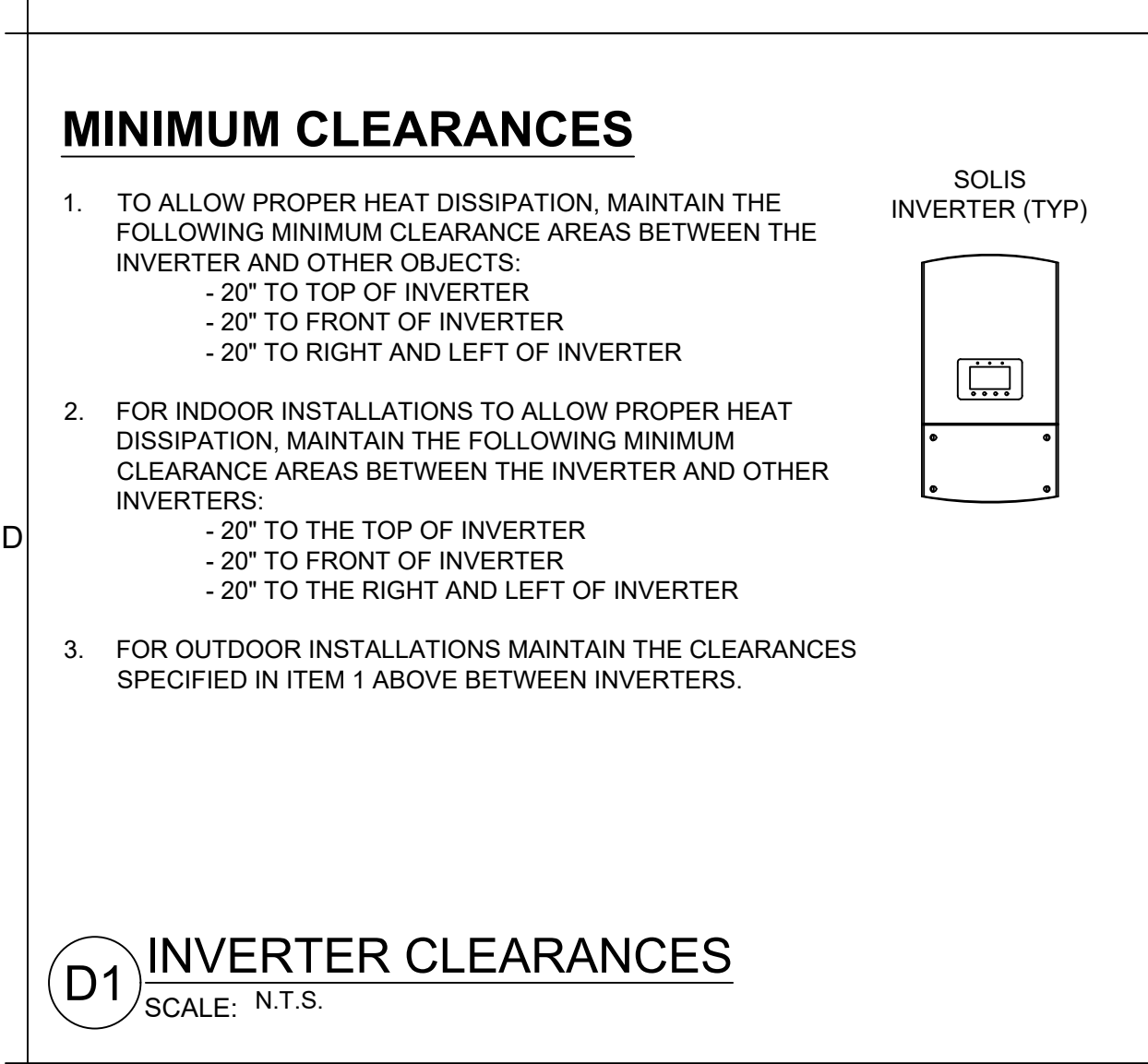
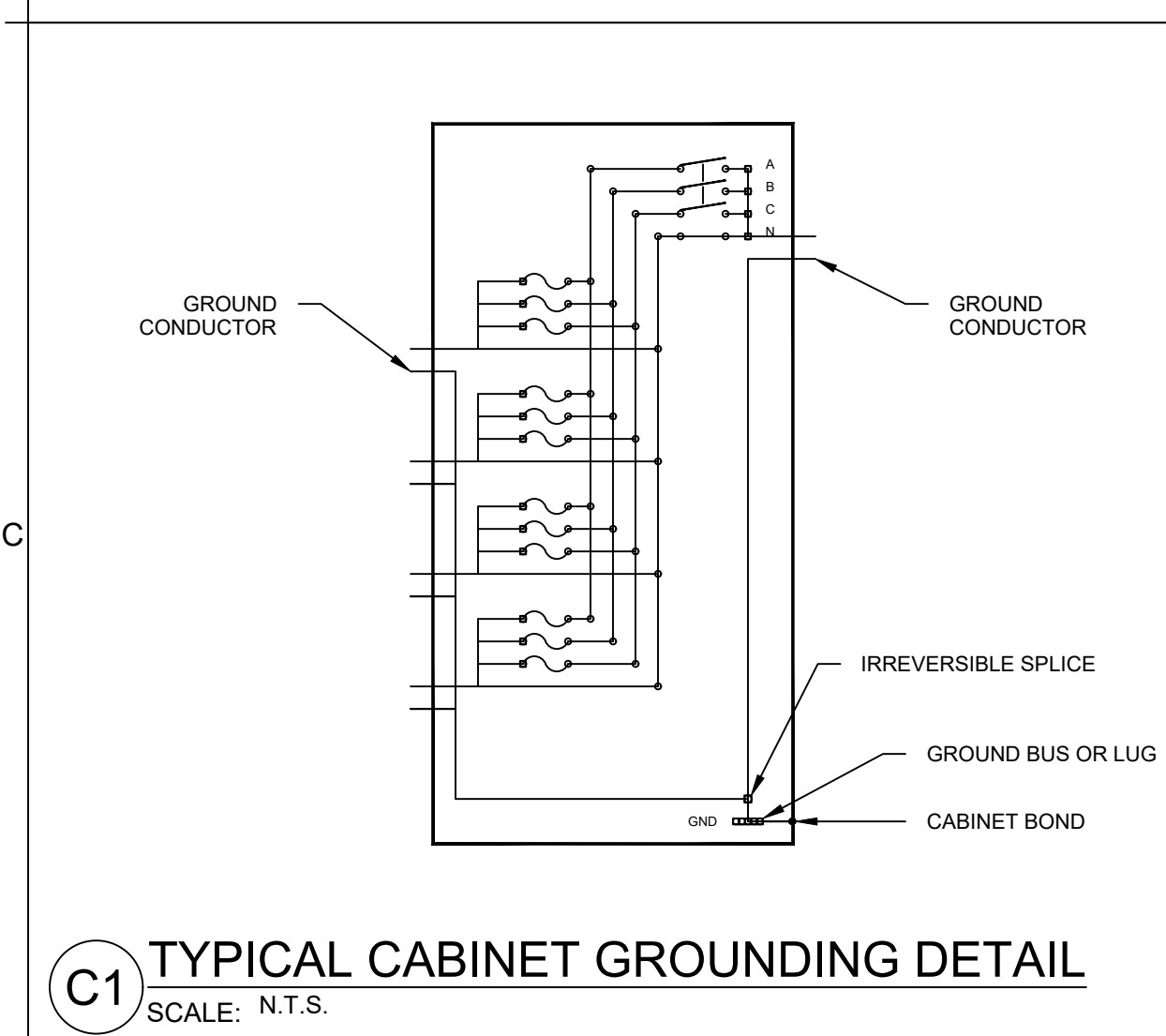
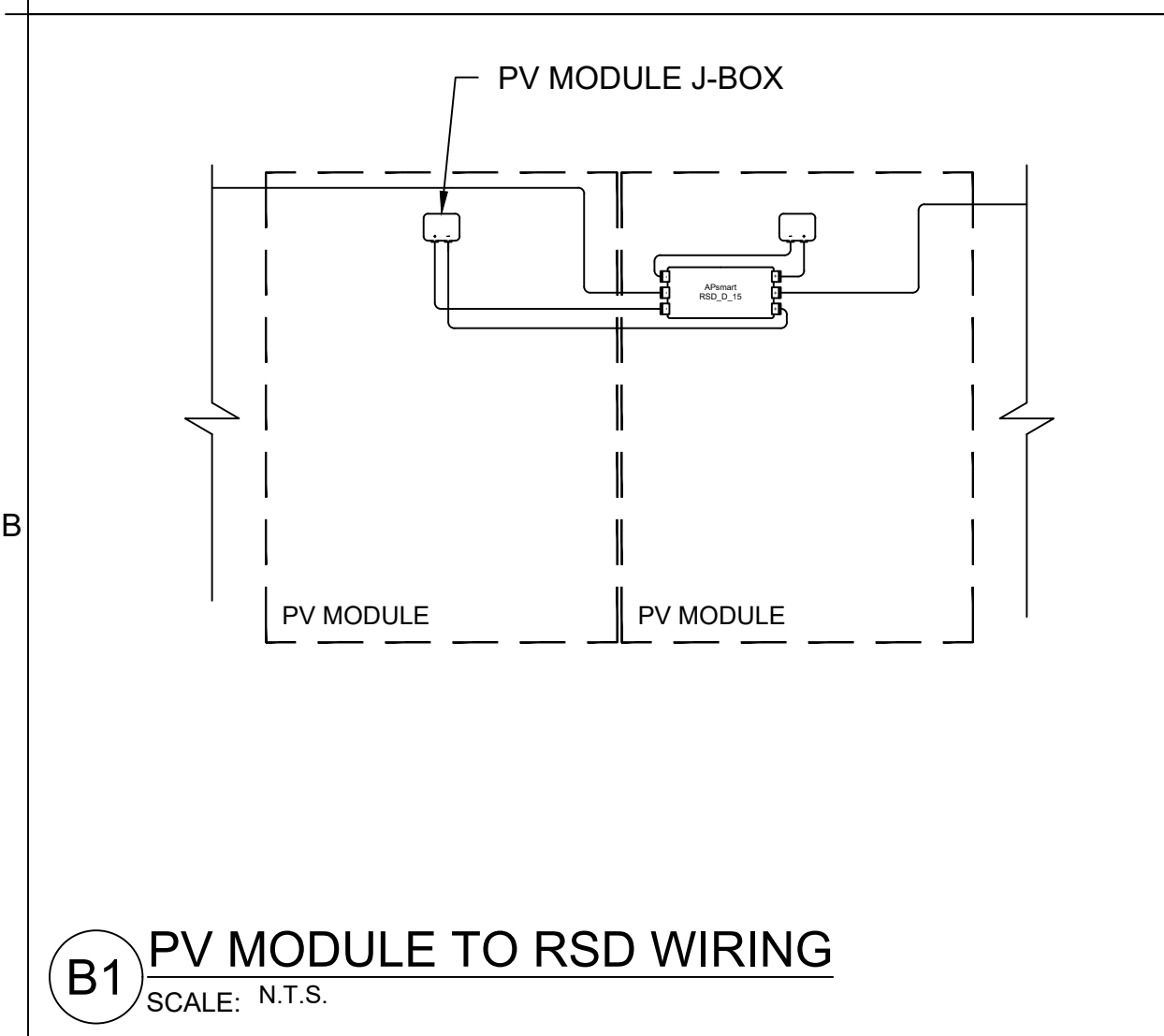
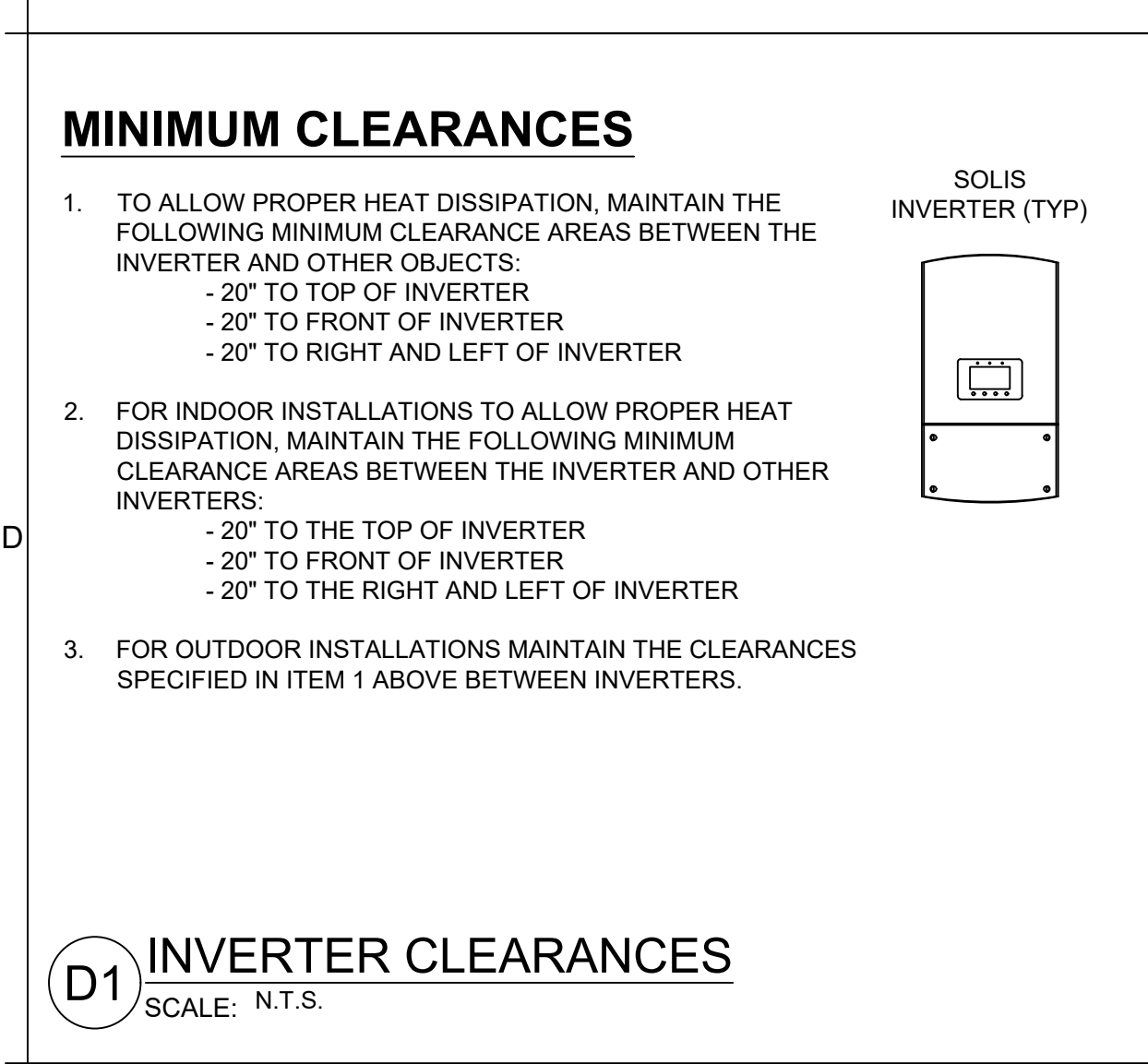
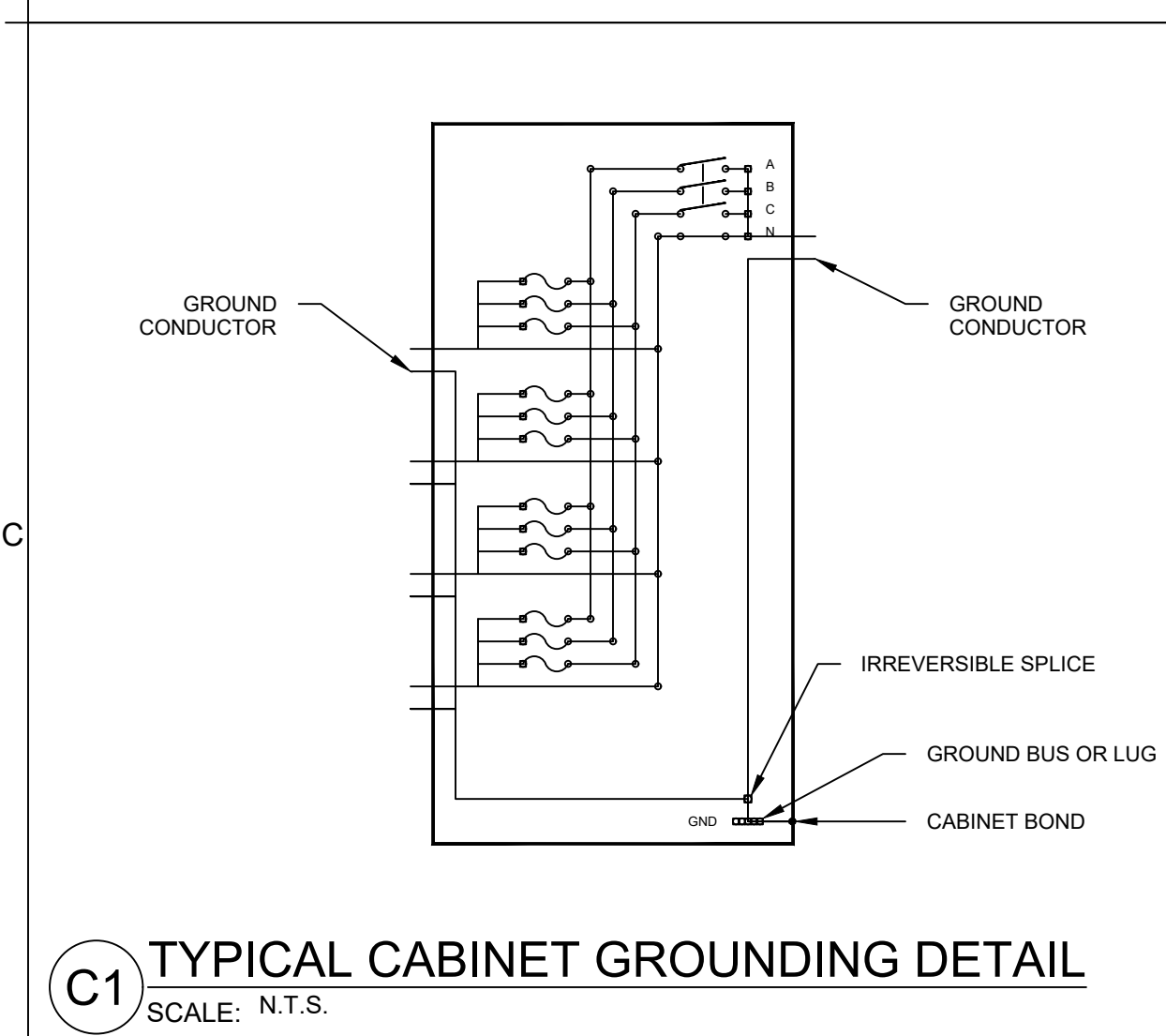
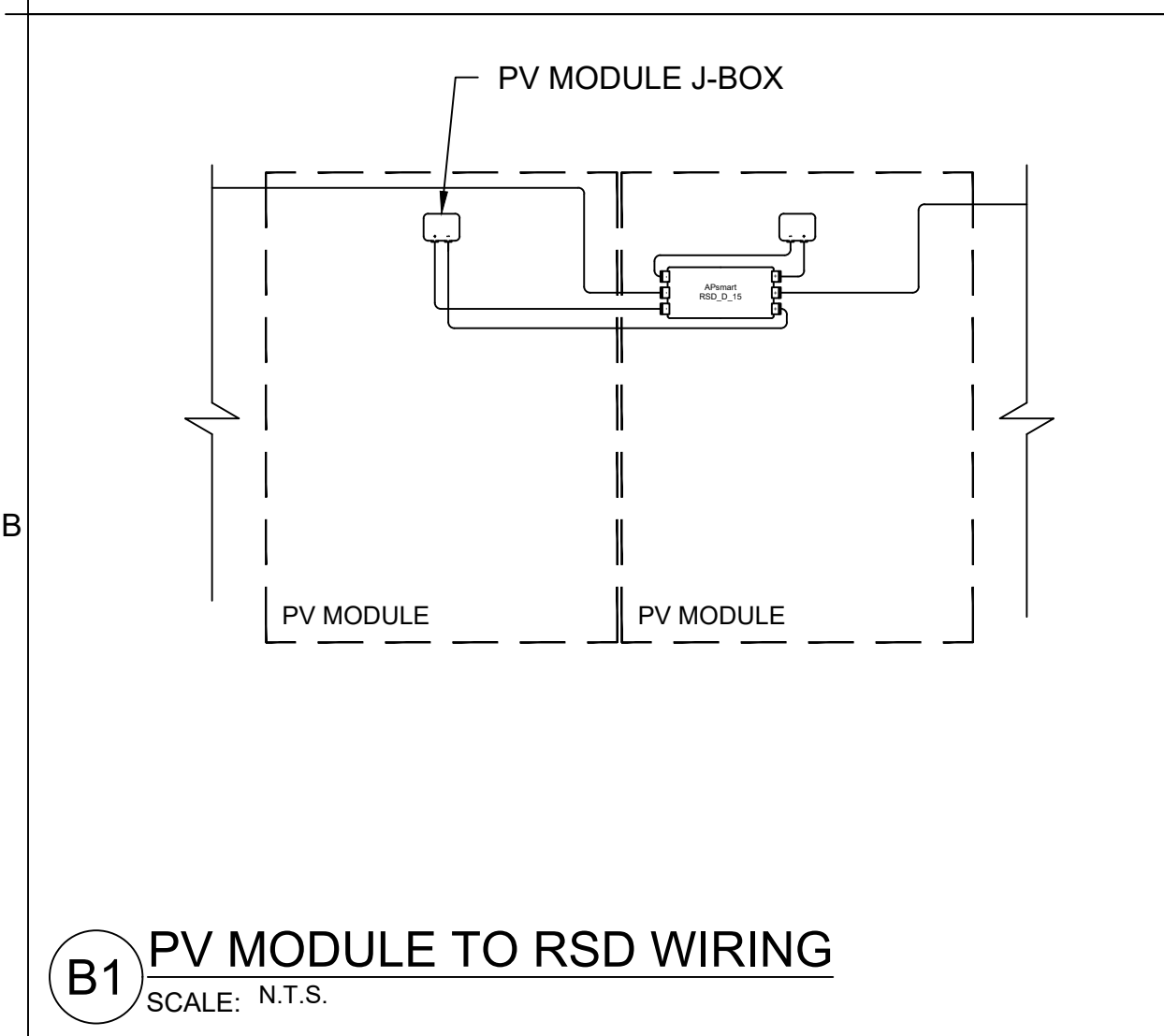
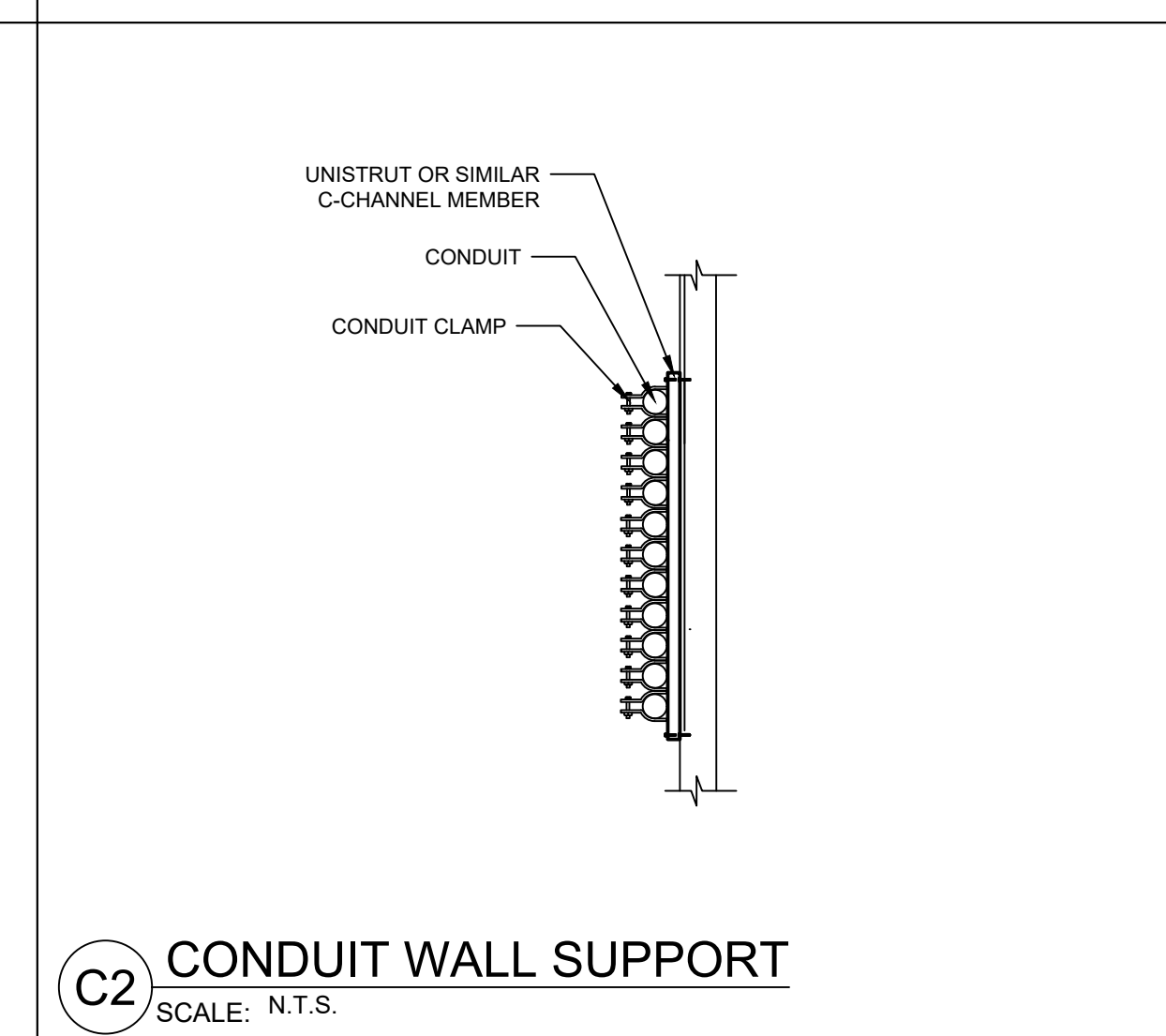
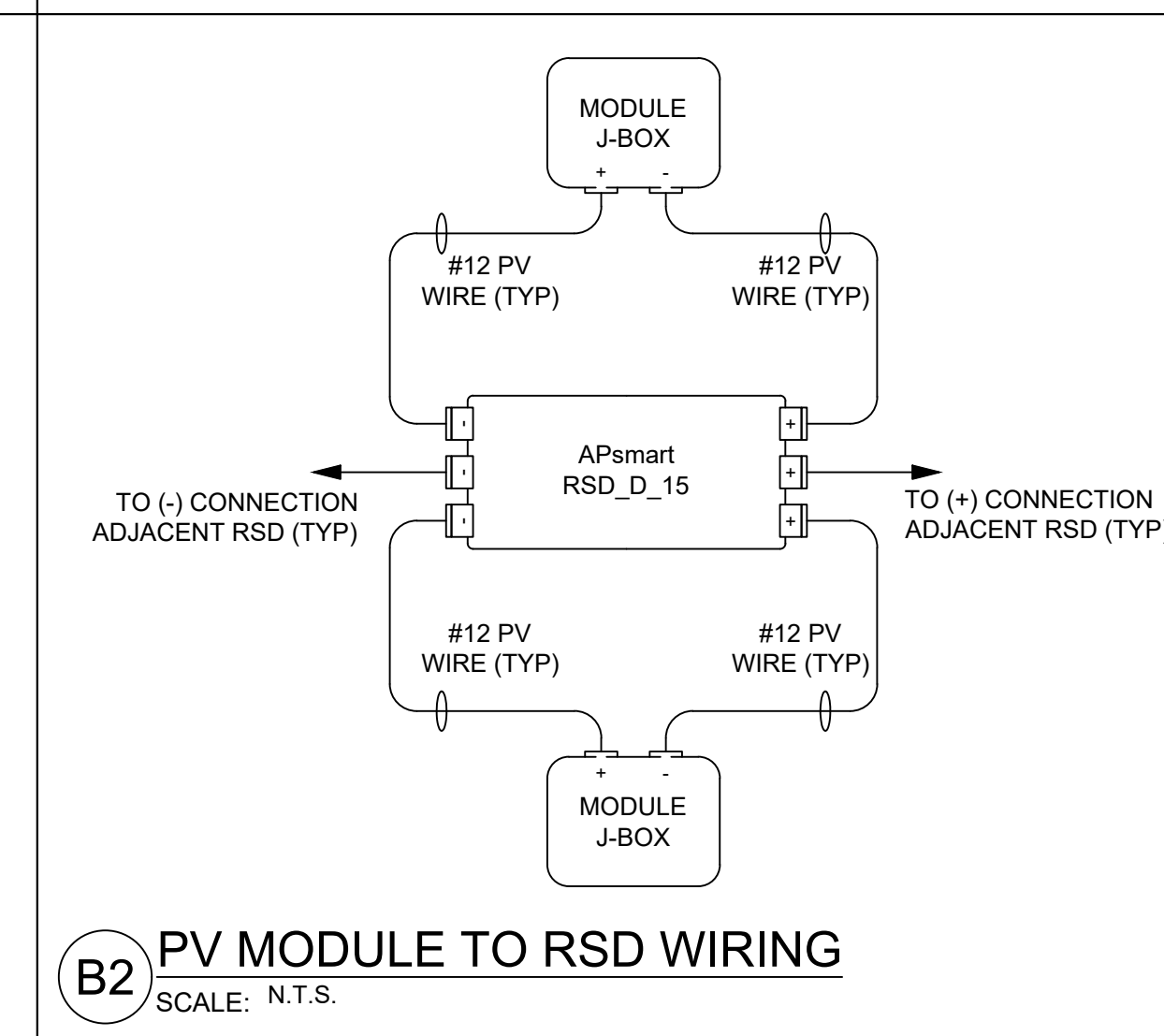
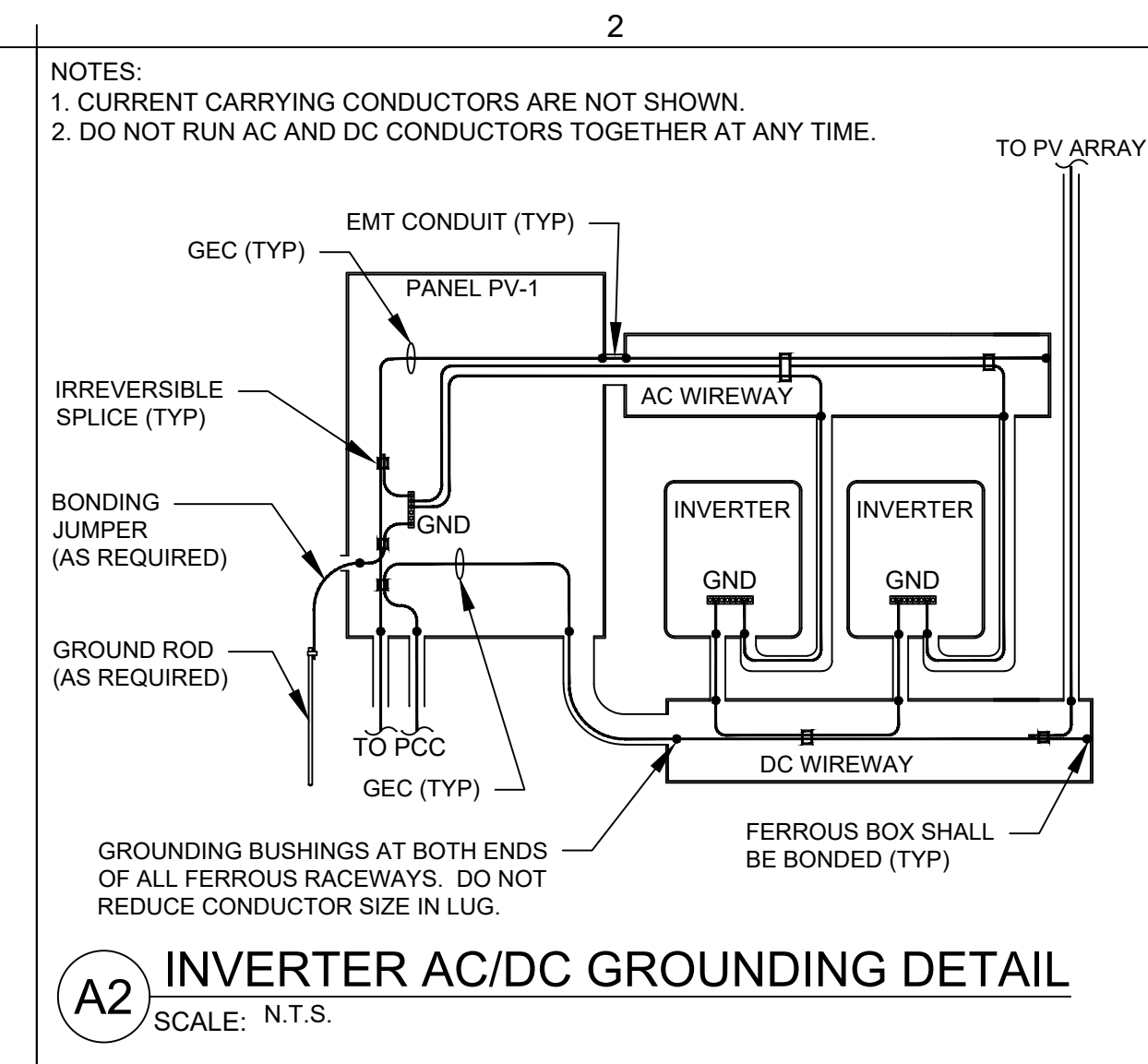
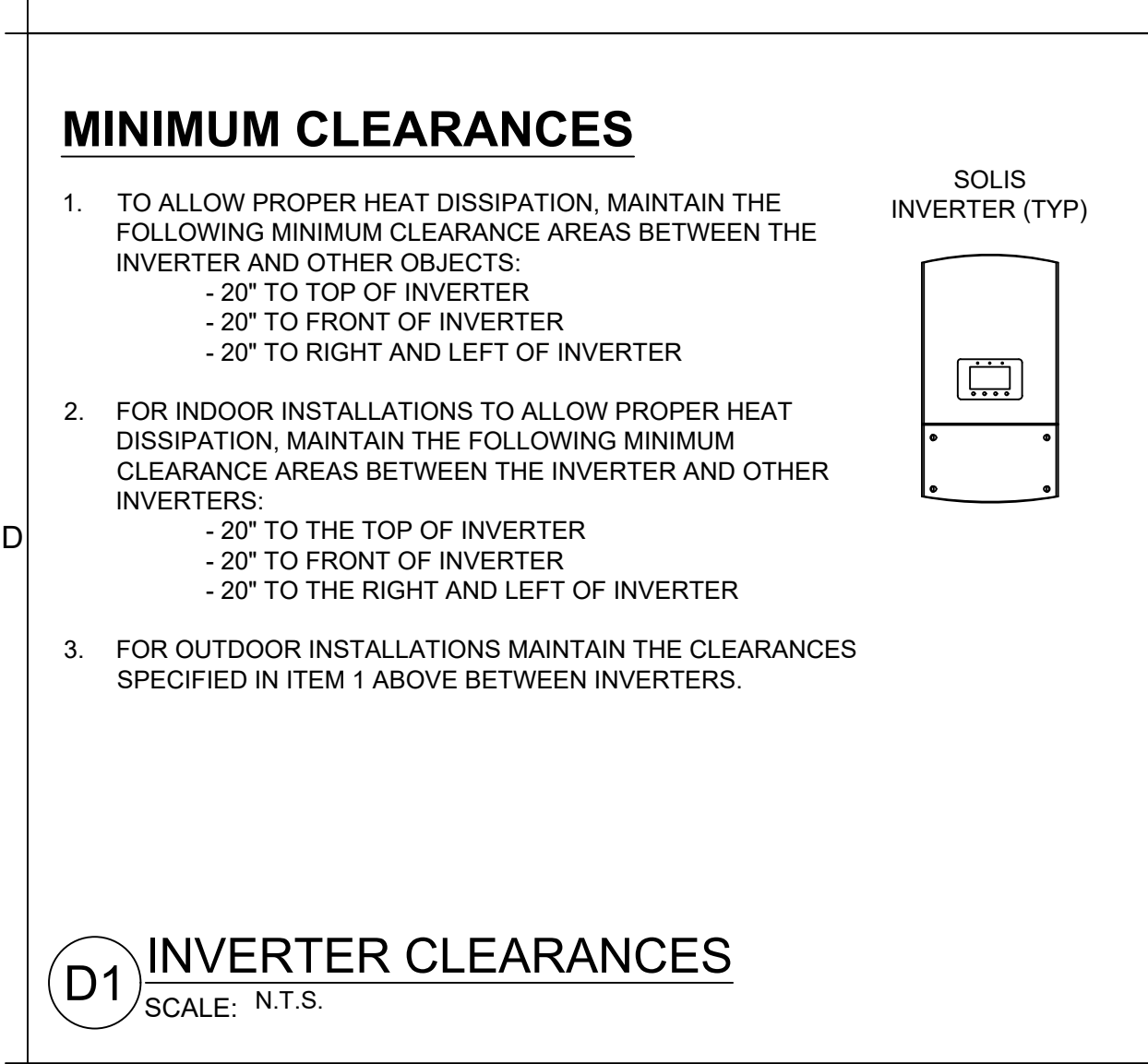
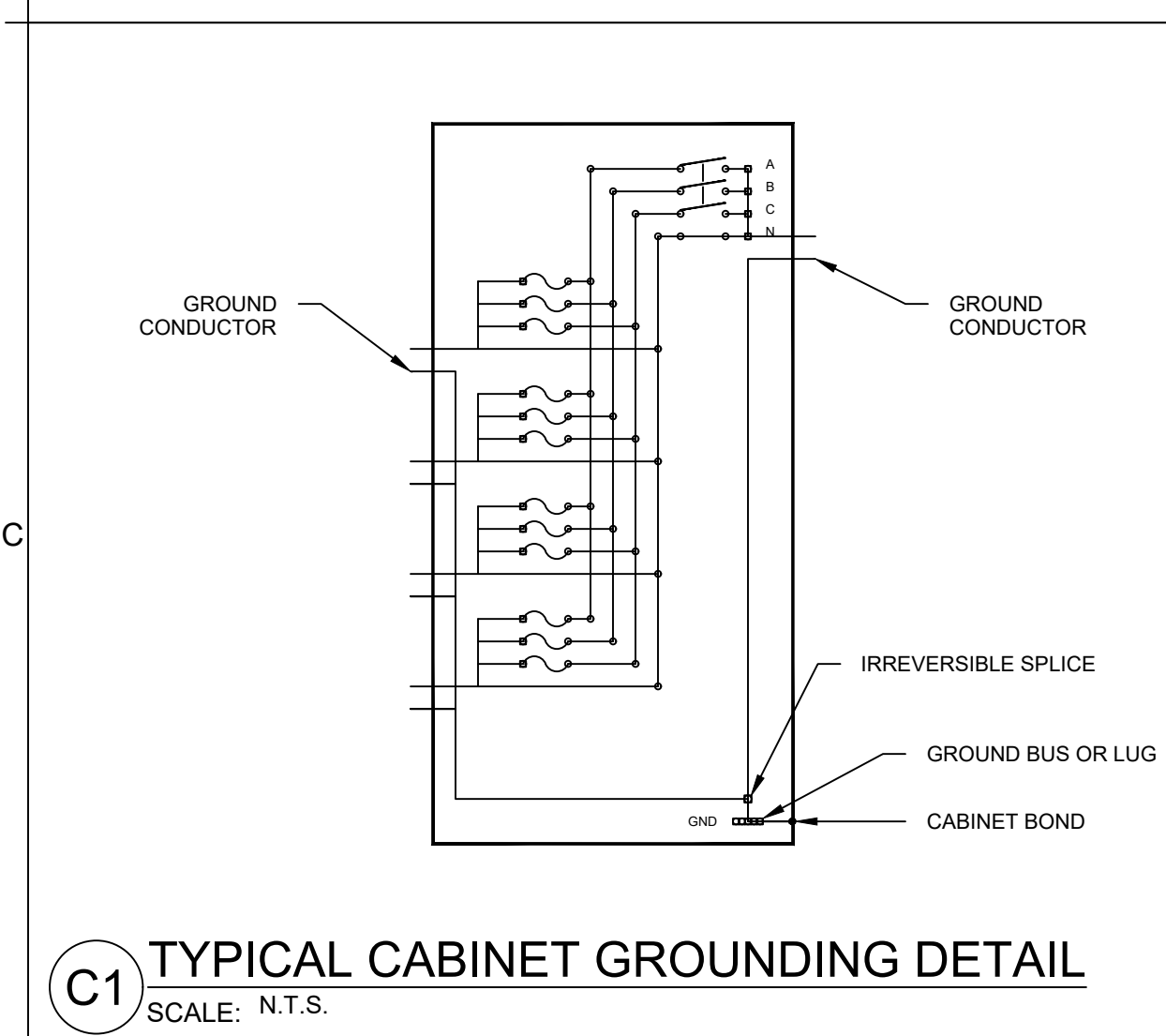
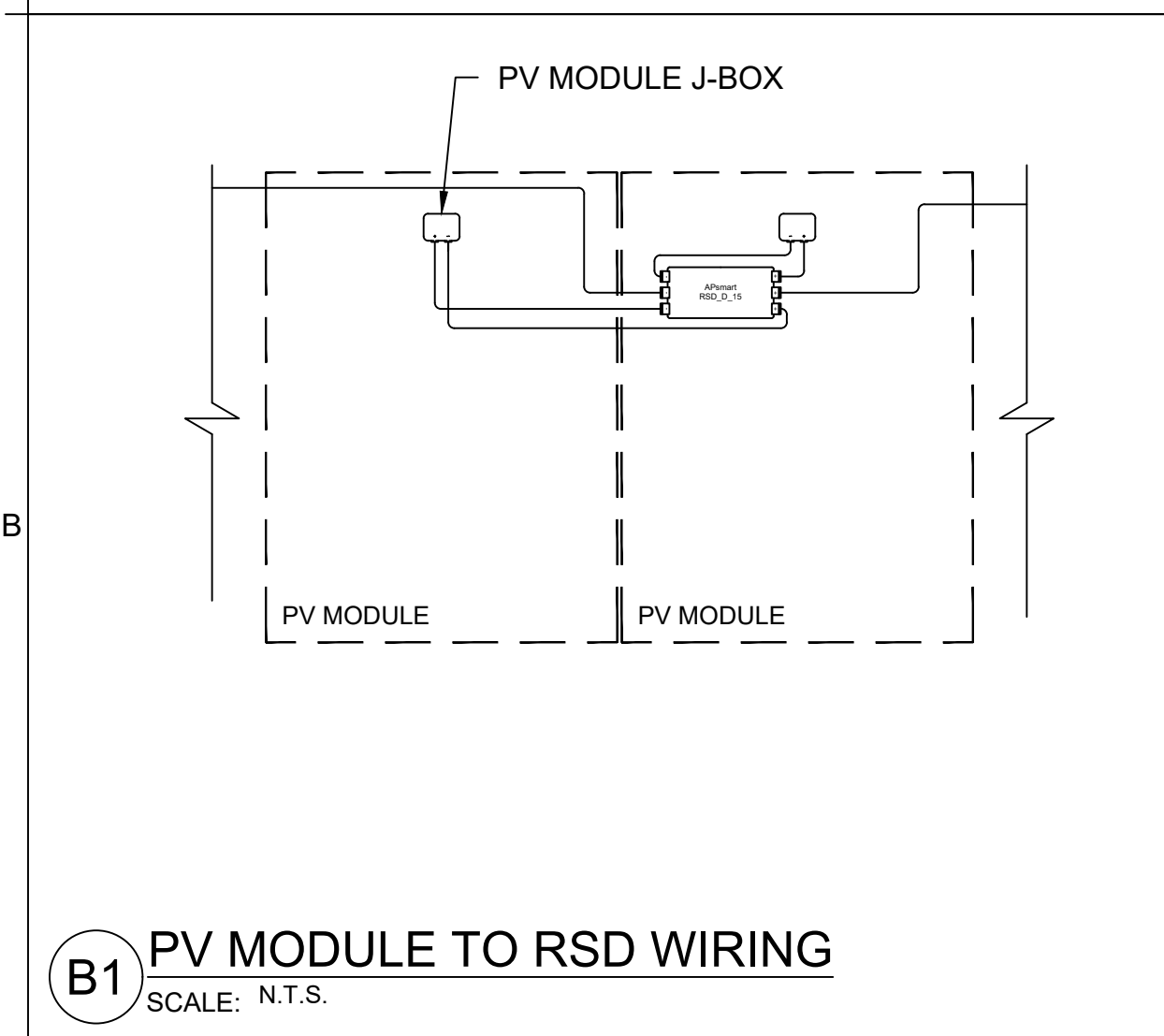
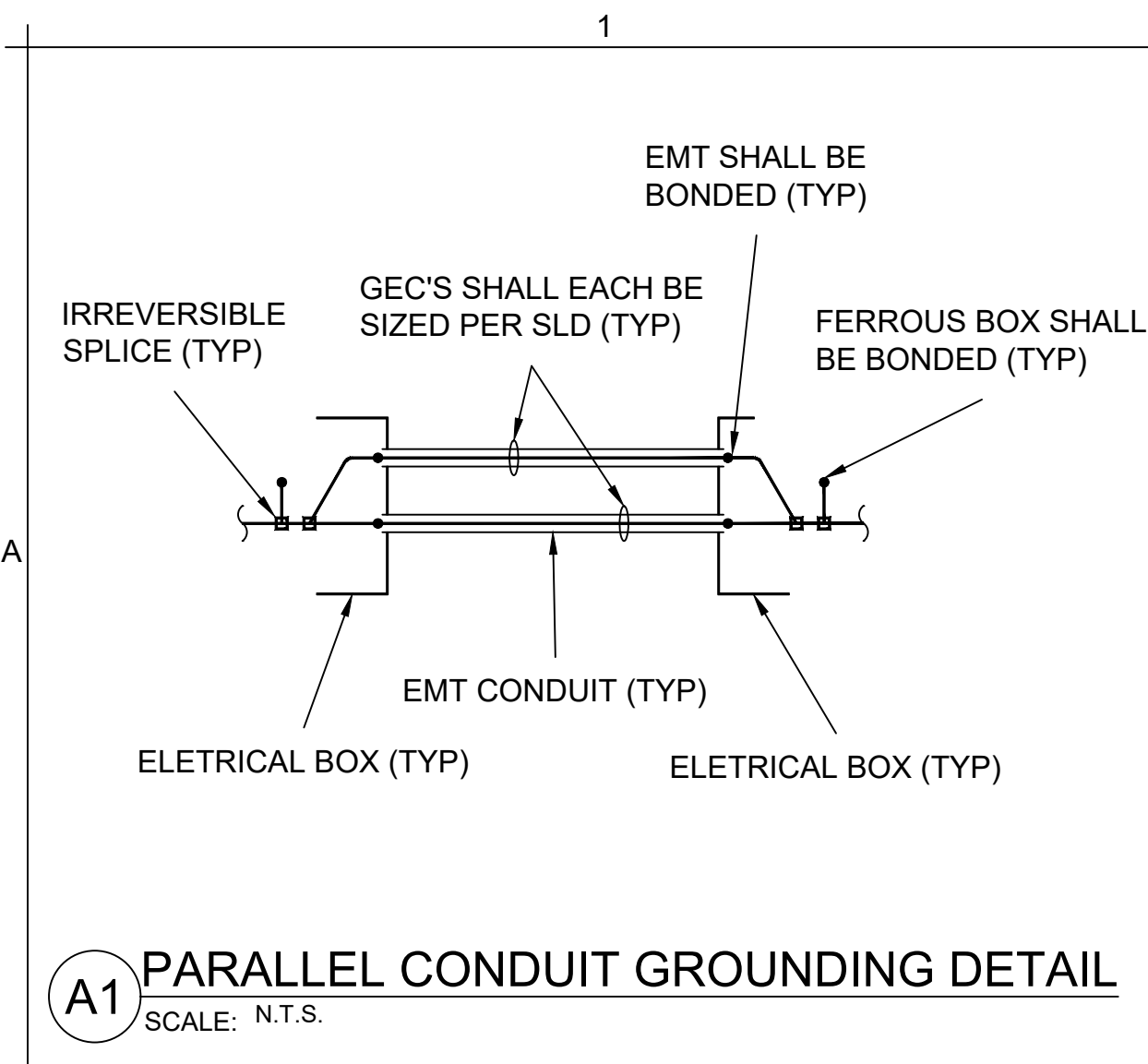
REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022		
2	MATERIAL CHANGE	4/5/2023		

PROJECT #: 1001360
DESIGNED BY: C.C.
CHECKED BY: F.L.
DATE: 10/28/2022
SCALE: AS SHOWN
SHEET: E3.0

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1st Light Energy

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License No. 055765, Expiration Date: 12/31/2023

1ST LIGHT
 1869 MOFFAT BOULEVARD, MANTENCA CA 95358
 P: 209.824.5300 F: 209.824.5275
WWW.1STLIGHTENERGY.COM

Exp. Date: 12/31/2023
 Date Certified and Signed: 05/30/2023

PUBLIC STORAGE #25905
 515 S GREENBORO ST
 CARRBORO, NC 27510
 APN 9778839403

EQUIPMENT DETAILS & EQUIPMENT ELEVATIONS

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022	C.C.	
2	MATERIAL CHANGE	4/5/2023	C.C.	

PROJECT #: 1001360
 DESIGNED BY: C.C.
 CHECKED BY: F.L.
 DATE: 10/28/2022
 SCALE: AS SHOWN
 SHEET: E4.0

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1st Light Energy

1

B

C

D

1

2

2

3

3

4

4

5

5

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License No. 051274, Expiration Date: 12/31/2024



1989 MOFFAT BOULEVARD, MANTECA CA 95336
P: 209.824.5500 F: 209.824.5275
WWW.1STLIGHTENERGY.COM



Exp: 12/31/2024
Date Certified and Signed: 05/30/2023

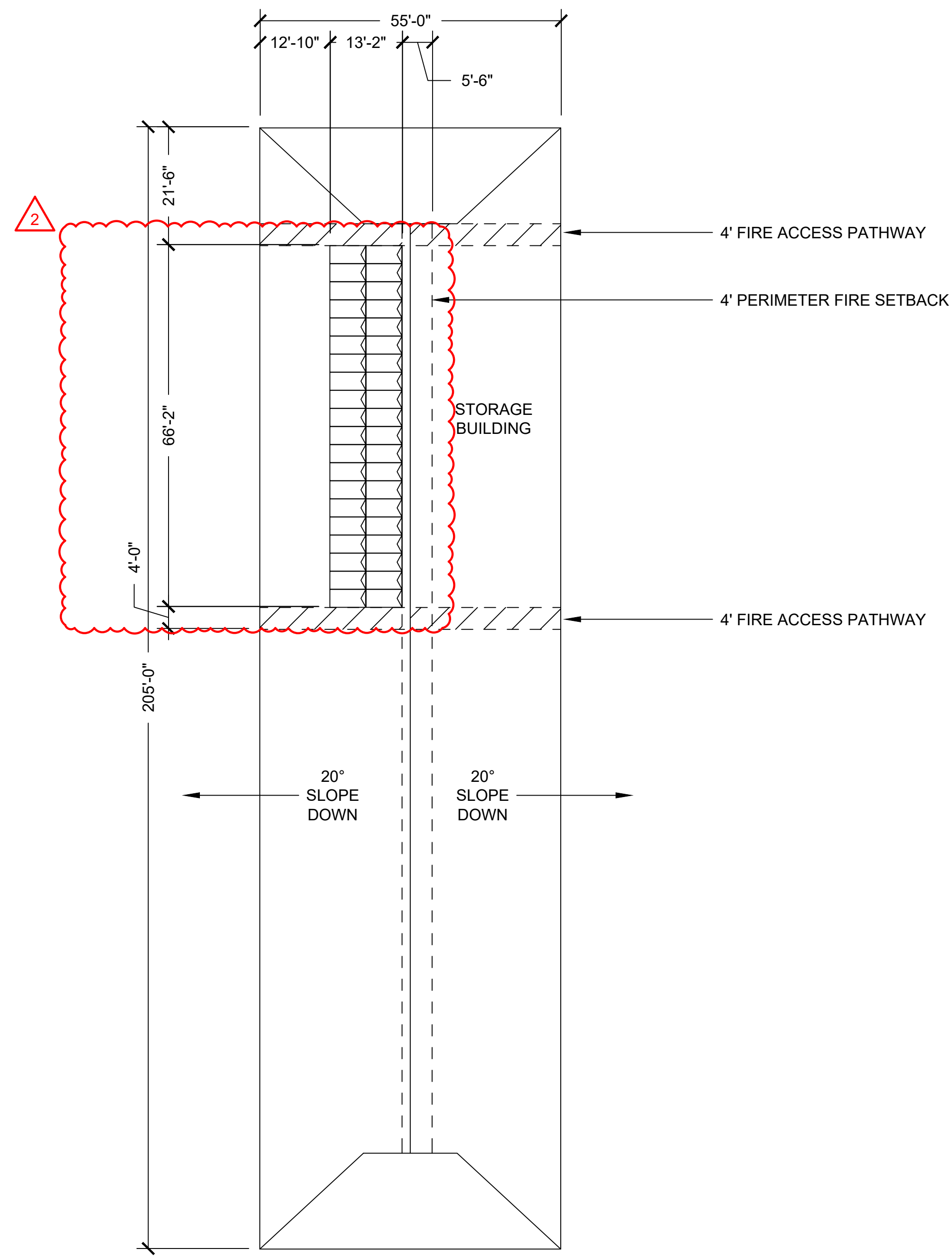
PROJECT NAME:
PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

ROOF ZONES AND SETBACKS

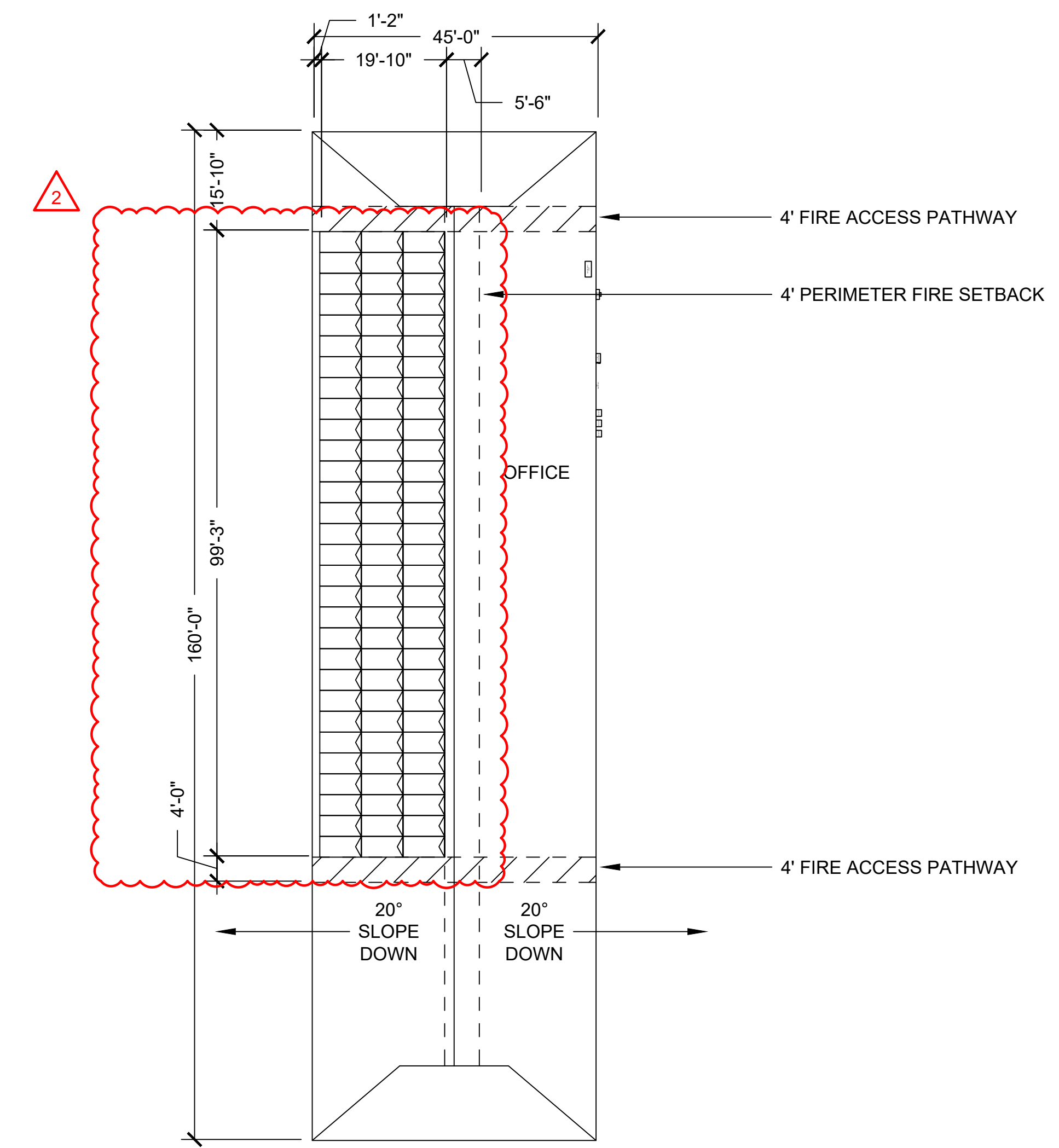
SHEET TITLE:

REV #	DESCRIPTION	DATE	DESIGNER
1	INITIAL PLANSET	10/28/2022	C.C.
2	MATERIAL CHANGE	4/5/2023	C.C.

PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SIZE:	D
SCALE:	AS SHOWN
SHEET:	S1.0



C1 SYSTEM A - ROOF ZONES AND SETBACKS
SCALE: 1:200



C2 SYSTEM B - ROOF ZONES AND SETBACKS
SCALE: 1:200

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of North Carolina.

License No. 051274, Expiration Date: 12/31/2024



1989 MOFFAT BOULEVARD, MANTECA CA 95236
P: 209.824.5500 F: 209.824.5275
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Exp: 12/31/2024
Date Certified and Signed: 05/30/2023

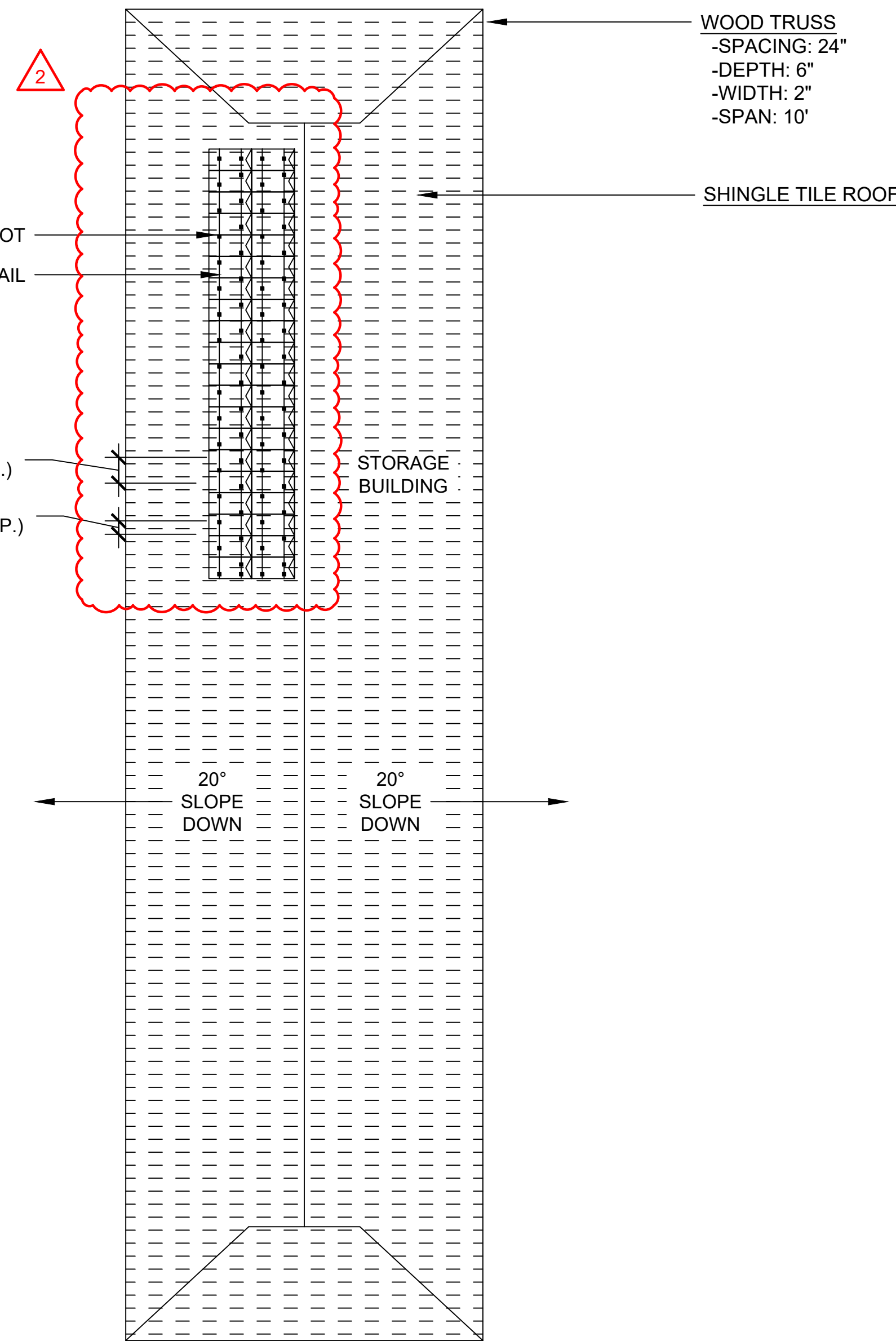
PROJECT NAME:
PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

MODULE MOUNTING & STRUCTURAL PLAN

SHEET TITLE:

REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022		C.C.
2	MATERIAL CHANGE	4/5/2023		C.C.

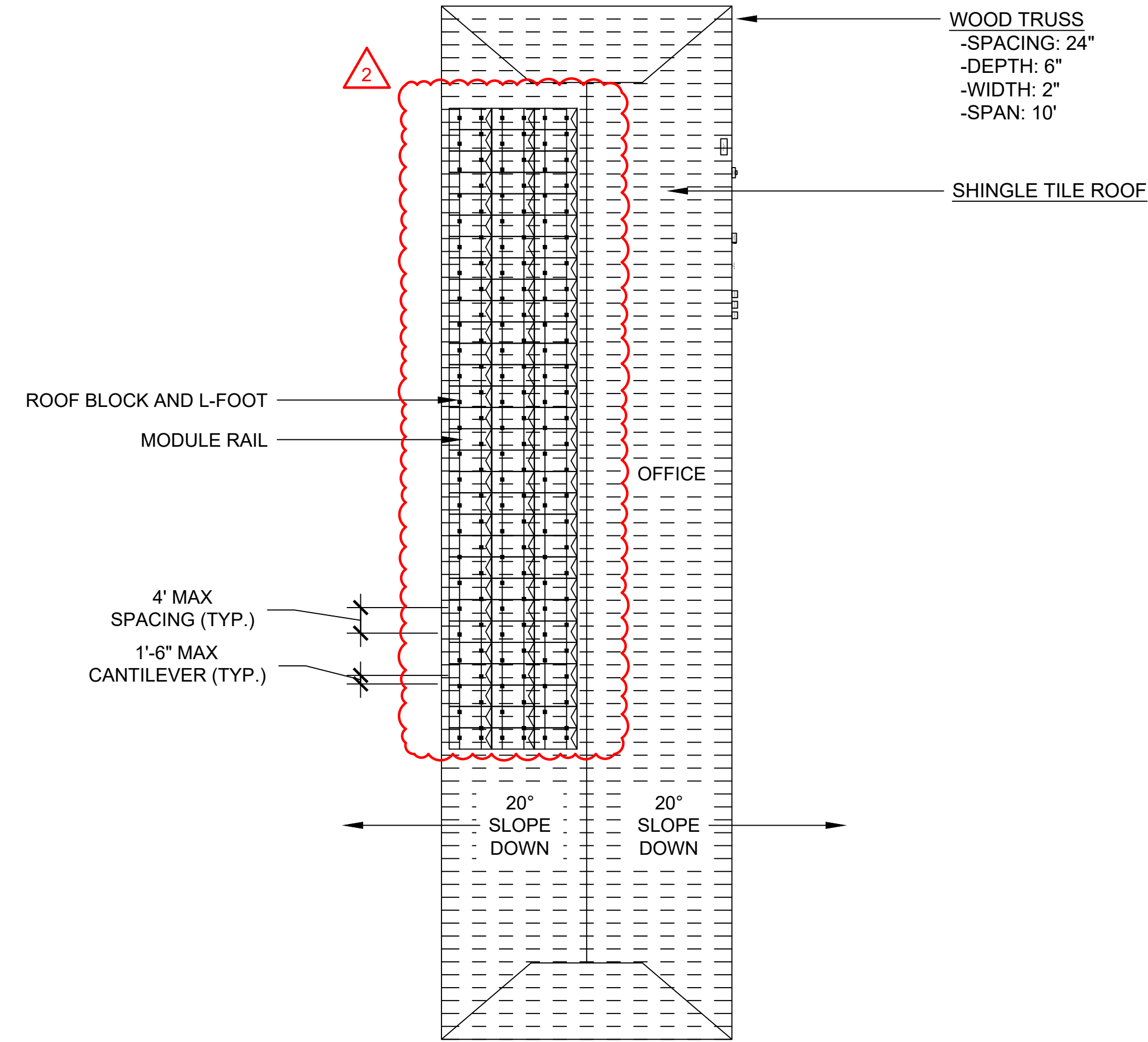
PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SIZE:	D
SCALE:	AS SHOWN
SHEET:	S1.1



C1 STORAGE BUILDING - MODULE MOUNTING & STRUCTURAL PLAN
SCALE: 1:200

TOTAL SYSTEM WEIGHT (LBS.)	1785.60
NUMBER OF ATTACHMENTS	70
WEIGHT PER ATTACHMENT (LBS.)	25.51
ARRAY AREA (SQ. FT.)	785.60
ARRAY LOAD (PSF)	2.27
ROOF AREA (SQ. FT.)	11275.00
ARRAY ROOF COVERAGE (%)	6.97
DISTRIBUTED LOAD (PSF)	0.16

D1 STORAGE BUILDING - RACKING WEIGHTS
SCALE: N.T.S.



C2 OFFICE - MODULE MOUNTING & STRUCTURAL PLAN
SCALE: 1:200

TOTAL SYSTEM WEIGHT (LBS.)	4017.60
NUMBER OF ATTACHMENTS	138
WEIGHT PER ATTACHMENT (LBS.)	29.11
ARRAY AREA (SQ. FT.)	1768.70
ARRAY LOAD (PSF)	2.27
ROOF AREA (SQ. FT.)	7200.00
ARRAY ROOF COVERAGE (%)	24.57
DISTRIBUTED LOAD (PSF)	0.56

D3 OFFICE - RACKING WEIGHTS
SCALE: N.T.S.

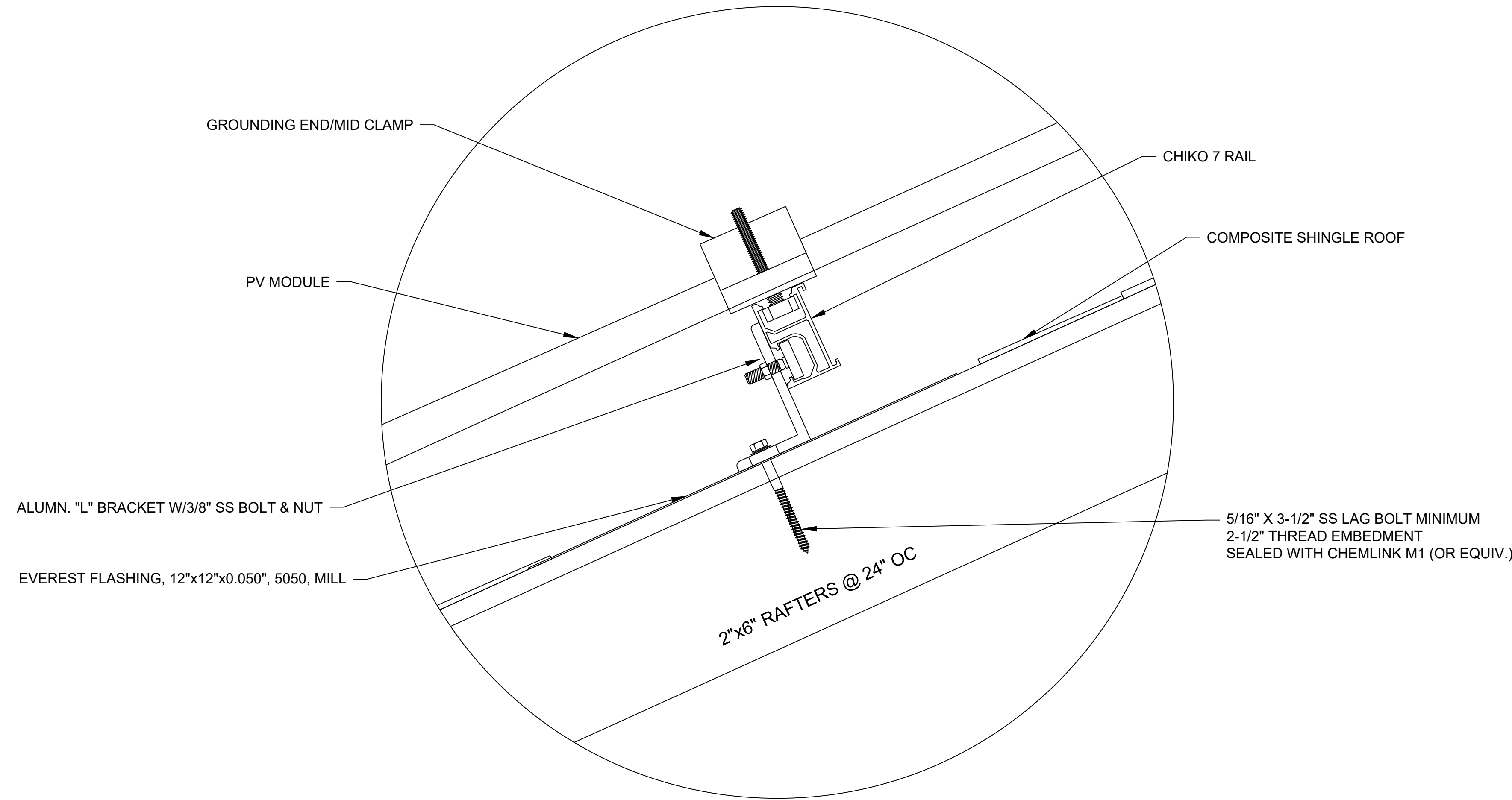
Prior to the commencement of work, the contractor shall verify the existing roof and framing conditions. Notify new@engineerinc.io of any Discrepancies prior to starting construction. Prior to the commencement of work, the contractor shall inspect framing for any damage such as water damage, cracked framing, etc. and notify new@engineerinc.io if any issues are found. These Plans are stamped for structural code compliance of the roof framing supporting the proposed PV installation reference only. These plans are not stamped for water leakage. PV modules, racking, and attachment components must follow manufacturer guidelines and requirements.



Exp: 12/31/2024
Date Certified and Signed: 05/30/2023

PROJECT NAME:
PUBLIC STORAGE #25905
515 S GREENBORO ST
CARRBORO, NC 27510
APN 9778839403

SHEET TITLE:
ATTACHMENT DETAILS



C1 ROOF ATTACHMENT DETAIL
SCALE: N.T.S.

CHIKO 7 RAIL FIRE RATING:

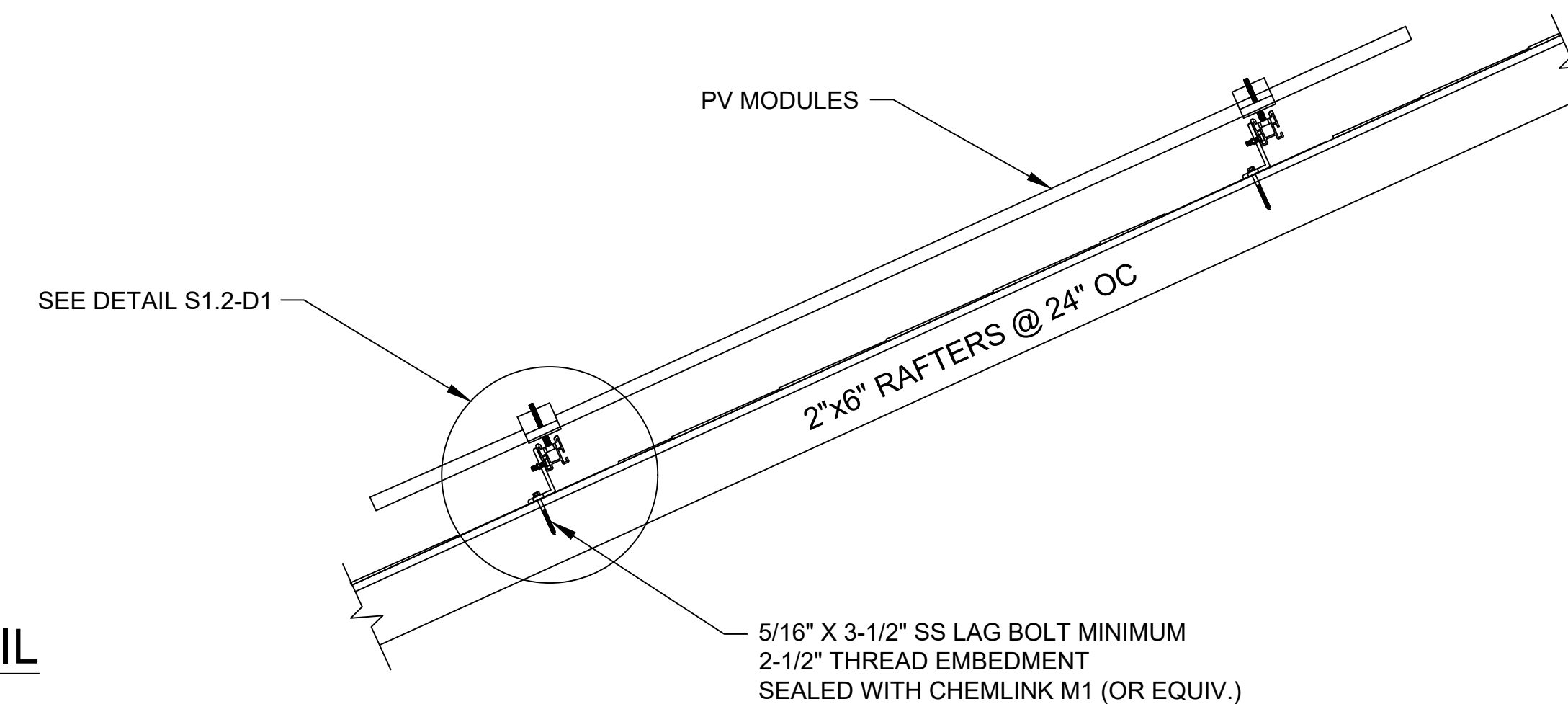
THE CHIKO 7 RAIL SYSTEM HAS UNDERGONE FIRE PERFORMANCE TESTING IN ACCORDANCE WITH UL 2703, FIRE PERFORMANCE. A SYSTEM CLASS A FIRE RATING IS ACHIEVED WHEN USING CHIKO 7 RAIL UNDER THE FOLLOWING CONDITIONS:

- ROOF SLOPE OF 2/12" RISE PER LINEAR FOOT OR GREATER
- USED IN COMBINATION WITH A UL 1703 LISTED MODULE WITH A FIRE PERFORMANCE RATING OF TYPE 1, TYPE 2, OR TYPE 3. CONSULT THE MODULE MANUFACTURER FOR SPECIFIC FIRE PERFORMANCE RATING INFORMATION.
- CHIKO 7 RAIL SYSTEM MAY BE MOUNTED USING ANY STAND-OFF HEIGHT TO MAINTAIN THE CLASS A FIRE RATING. ALWAYS CONSULT THE MODULE MANUFACTURER'S INSTALLATION INSTRUCTIONS TO ENSURE YOUR INSTALLATION IS IN COMPLIANCE WITH THEIR UL 1703 LISTING.
- THE RESULTS OF THE RACKING SYSTEM DO NOT IMPROVE A ROOF COVERING CLASS RATING.

ALL DOCUMENTATION CAN BE FOUND ON UL'S ONLINE DATABASE AS WELL AS CHIKO USA WEBSITE.

D1 RAIL FIRE RATING
SCALE: N.T.S.

D2 ROOF ATTACHMENT DETAIL
SCALE: N.T.S.



REV #	DESCRIPTION	DATE	DESIGNER	C.C.
1	INITIAL PLANSET	10/28/2022	C.C.	
2	MATERIAL CHANGE	4/5/2023	C.C.	

PROJECT #:	1001360
DESIGNED BY:	C.C.
CHECKED BY:	F.L.
DATE:	10/28/2022
SCALE:	D
SCALE:	AS SHOWN
SHEET:	S1.2

PUBLISHED: 2023-Apr-05 11:29 AM

1st Light Energy